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Developed for the educable mentally retarded, this spiral program of science instruction presents its subjects on several levels for advanced study and reinforcement. Subjects covered are animals, plants, weather and seasons, earth and earth components, the universe, forces, and the human being. Guides for the primary, intermediate, junior high, and senior high levels include general objectives, activities, and sample experiences. A complete starter unit is included for the first three levels on pets, the senses, and the weather. Suggested resource materials are listed for all levels; forms are included for teacher evaluation of the material. (LE)

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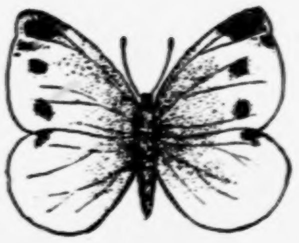
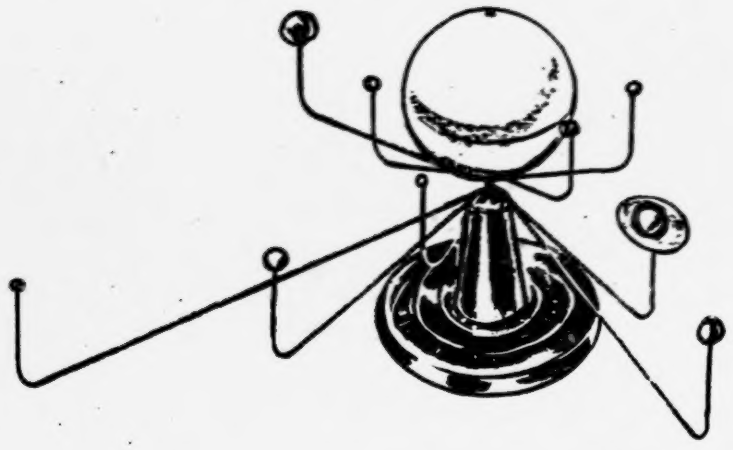
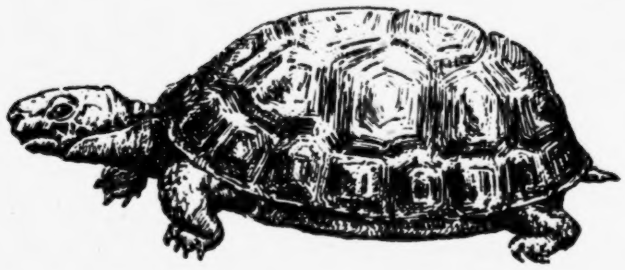
SPECIAL EDUCATION
CURRICULUM DEVELOPMENT CENTER
- an in-service training approach



SCIENCE



- SUGGESTED CONTENT
- ACTIVITIES
- EXPERIMENTS



A COOPERATIVE PROGRAM INVOLVING
THE IOWA STATE DEPARTMENT OF PUBLIC INSTRUCTION
AND THE UNIVERSITY OF IOWA

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PLEASE READ

The Special Education Curriculum Development Center has as its main objective the operation of a statewide in-service training program for teachers of the mentally retarded. Twenty special class teachers from different geographic areas of Iowa serve as consulting teachers. They attend training sessions at The University of Iowa and then return to their home area to conduct field sessions. All materials prepared for SECDC are intended for dissemination through the field sessions conducted by the consulting teachers. Persons reading SECDC material but not attending the field sessions should keep in mind that the purpose of the material is to serve as a starting point for in-service training and that the publications themselves are not end products.

It should also be noted that any reference to commercially prepared materials by the Special Education Curriculum Development Center does not constitute a recommendation or endorsement for purchase. The consideration of such material is intended solely as a means of assisting teachers and administrators in the evaluation of materials.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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IN-SERVICE TRAINING MATERIALS FOR TEACHERS OF THE EDUCABLE MENTALLY RETARDED

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TABLE OF CONTENTS

Page

Introduction 1

Primary Level

Animals 7

Plants 15

Weather and Seasons 23

Earth and Earth Components 31

Universe 39

Forces 47

Starter Unit: Our Pets 57

Intermediate Level

Animals 89

Plants 97

Weather and Seasons 105

Earth and Earth Components. 113

Universe. 121

Forces 129

Human 137

Starter Unit: The Senses 143

Junior High Level

Animals 159

Plants 165

Weather and Seasons 173

Earth and Earth Components. 181

Universe 189

Page

Forces 195

Human 203

Starter Unit: The Weather 209

Senior High Level

Animals 231

Plants 237

Weather and Seasons. 241

Earth and Universe 247

Forces 251

Human 257

Resource Material 262

INTRODUCTION

The lack of emphasis in teaching science to students enrolled in special classes for the educable mentally retarded becomes apparent as one reviews published curriculum guides and observes special class instruction. Why this situation exists is open to speculation. Possibly one of the major reasons is that the subject of science has come to be identified as an academic area of study much beyond the capabilities of the mentally retarded. If this were the only factor involved, the problem could be resolved merely by illustrating to teachers the many simplified scientific concepts of crucial importance in our daily lives and by pointing out the almost limitless opportunities related to science. However, as the problem was discussed among the SECDC staff members and resource persons it became evident that probably the teacher's lack of preparation in the area of science and the paucity of available guidelines for planning science programs for the educable mentally retarded were also significant contributors to the dilemma.

Science need not be taught as a series of lessons on specific concepts. A functional approach to the teaching of science should emphasize instruction on concepts which directly relate to the students' daily experience. In many cases this means teaching science concepts as a part of units on homemaking, occupations, health, and safety, to mention a few examples. In other situations the teacher may capitalize on incidents which are relevant and appealing to the student such as changes in weather, current events related to space, and simple experiments.

In view of this situation it seemed reasonable that a beginning attempt to explore the teaching of science to the educally mentally retarded should focus on specifying general objectives and identifying appropriate content to be included in a science program. This document includes general objectives, an outline of content, suggested experiments, and selected starter units. The material is prepared on four levels of difficulty. It should be noted that the suggestions are not to be interpreted as a course of study, rather it is intended to offer special class teachers direction in structuring their science activities.

Organization of the Material

The subject coverage suggested here is spiral in form. This is opposed to the terminal plan of covering a topic on one level with no future development. For the educable mentally retarded, the spiral program carries a subject through several levels for the purposes of reinforcement and more advanced study. It is assumed that the material included for each level will be taught over a period of approximately two years.

Material written for the Primary, Intermediate, and Junior High levels follows a uniform format. The introductory paragraph is intended to state, in general terms, why the particular area of study is important for the educable mentally retarded. Also included are a few suggestions of unit topics relative to the subject area.

The points listed under General Objectives may be considered as goals for the study being presented. Topic I, "to develop ability to respond in basic social conversation or to recognize through sensory experiences...", implies that retarded children often do not fully understand concepts underlying facts and occurrences fundamental to daily living. However, we may hope to expose them to general references sufficient to provide a basic familiarity.

Topic II, "to develop ability in relation to...", indicates areas of possible understanding by the retardate and implies potential ability or skills as a result of learning.

Both areas are designed to promote good mental health through elimination of fears and superstitions regarding natural phenomena.

Topic III, "to develop positive attitudes on the part of students which reflect...", pertains to less tangible abilities. These overall attitudes may be reflected by either overt behavior or oral statements.

Initiatory activities are those used to begin a unit study and are suggested for motivation. However, use of incidental motivation should be made whenever possible. Although the selection of situations which might stimulate an interest in particular subject areas is of necessity left to the individual teacher, one purpose of this material is to provide assistance for teachers capitalizing on this sort of interest.

Naturally one cannot expect all areas of science coverage to evolve from motivational occurrences. Certain areas of study may be more effective at one particular time of the year than at another. In such cases, the teacher may employ some of the suggested initiatory activities.

Assimilating materials include suggestions for use in the entire study of a subject. The listing is broken into definite areas for ease in teacher use.

Ideas for field trips, speakers, and bulletin boards are examples and are expected to be expanded by the teacher according to specific units presented, particular locale, and school policy. These may also suggest further coverage.

Group and individual activities are intended only to indicate starter points from which the teacher may work in developing a sound unit appropriate for the particular level being taught. It is impossible to predict the abilities present in any given special class situation, and it is therefore anticipated that some suggestions may be either too limited or too advanced for a particular class. For this reason, the material presents varied suggestions rather than specific lesson plans. Seatwork, experience charts, and assistance with experiments will be more adequately developed by the teacher familiar with the specific abilities present.

Culminating activities will often grow out of particular class interests evolved from a unit study. Often, the amount of which has taken place and the resultant enthusiasm will warrant a project such as the display of accomplishments. In other situations, time and level of absorption may evidence need for nothing further than review.

Starter Units

The colored pages in this material mark the inclusion of three Starter Units, provided for organized study of some specific areas. They may also serve as a guide in using the unit method to develop a strong science program. The teacher will then detail this program after a period of experimenting with the content coverage suggested within this manual. The development of units for the various subject areas should lessen the tendency to merely teach unrelated scientific facts. The unit method will promote and facilitate the establishment of a useful program of science in the curriculum for the educable mentally retarded.

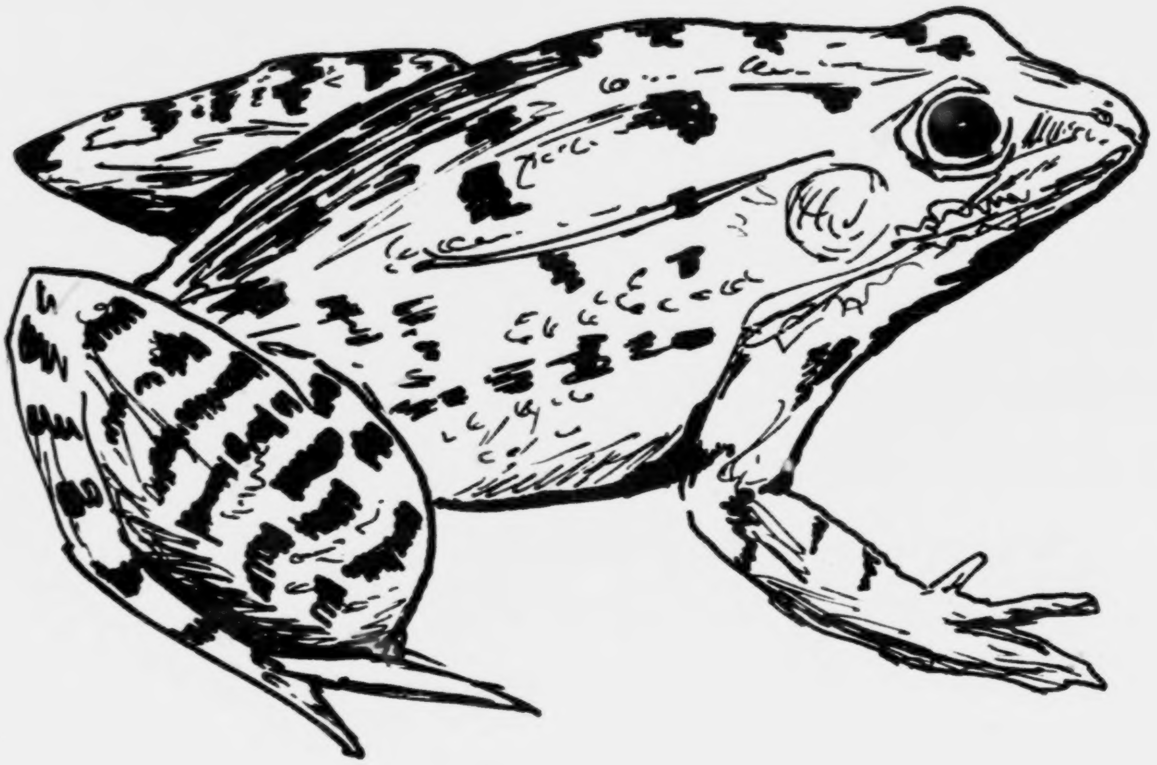
PLEASE NOTE

The evaluation sheets found at the conclusion of this material represent the continuing effort of the Special Education Curriculum Development Center to meet the needs of the Special Class teacher. It is requested that teachers using this material record statements and specific evaluation points as indicated and submit this to the Center.

The time and effort given to this report will be greatly appreciated. You may be assured it will receive serious consideration in structuring guidelines for further development of materials to be disseminated.

PRIMARY LEVEL . . .

ANIMALS



Primary Level

STUDY OF ANIMALS

Opportunities to observe, handle, and care for pets at home and in the classroom provide the possibility for a wide range of valuable concrete experiences. This situation, coupled with the natural appeal of animals as a source of interest and curiosity to children, greatly facilitates the teaching of this area of science. Even the study of animals on a simplified level allows children to acquire many basic scientific concepts, including characteristics of living things; the interdependence of man, plants, and animals; and reproduction. Sensory experiences also help to reinforce such related concepts as the importance of proper care of living things.

A listing of specific material to be presented during the teaching of units on animals should contain suggestions similar to the following: Pets, Animal Young, Animal Homes, How Animals Get Food, and How Animals Move About.

General Objectives
For the Study of Animals

Primary Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:
    A. How animals get food
    B. How animals are alike and different
    C. The needs of animals: shelter, air, water, and climate
    D. The dependence of man upon animals
    E. Basic effects of insects as a form of life

F. Basic effects of birds as a form of life

G. The relationship of animals to plants

II. To develop ability in relation to:

A. Care and handling of pets

B. Recognition of differences and similarities in animals

C. Use of vocabulary related to common animal life

D. Animal use of plant life

E. Showing respect for animal life

F. Conservation of animal life

G. Safety habits with animals (i.e., diseased, dead animals, etc.)

III. To develop positive attitudes on the part of students which reflect:

A. An appreciation of animal life as a source of responsibility and pleasure

B. An acceptance of the necessity for proper care of living things

C. A beginning understanding of characteristics basic to all living things as represented by animal life

D. An understanding that some animals may be happier in their natural environment than in captivity

Activities
In the Study of Animals

Initiatory:

1. Reading stories about pets and animals
2. Discussion of pets that class members might have or might like to have
3. Selection of pet(s) for classroom and listing of care assignments to be rotated among all class members
4. Use of an incident which could result in high class interest and dis-

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   - A. How animals get food
   - B. How animals are alike and different
   - C. The needs of animals: shelter, air, water, and climate
   - D. The dependence of man upon animals
   - E. Basic effects of insects as a form of life

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4. Use of an incident which could result in high class interest and dis-

cussion (i.e., finding a wounded bird or animal, children requesting to bring pets to school, appealing news item related to animal life, collection of student funds for class project such as purchase of pet or fish and equipment)

5. Observation of animals in process of hibernation or emerging from hibernation

Assimilating:

1. Field trips to a zoo, pet shop, or farm. Exploratory walks in the schoolyard, the neighborhood, or a local wooded area
2. Speakers such as a pet shop owner, a zoo keeper, a student with an unusual pet, or a veterinarian on safety with pets
3. Bulletin boards
    a. Sample animal coverings with pictures (connected by string or yard) of the animal from which it was taken; i.e., fur, feather, turtle shell, fish scales, hairs
    b. Fabric samples with animals from which they are produced; i.e., sheep, bird, milk, raccoon
    c. Pictures of animals in their natural habitat and the varieties of homes in which they live
    d. Pictures of animals and their young
4. Related individual and group activities
    a. Care of animals in classroom
    b. Comparison of growth in animals or fish receiving varied amounts of food, handling, air, and water
    c. Experience with "touch box" containing varied examples of animal coverings (i.e., fur, feather, scale, shell, tooth, etc.)

d. Observation of birds and animals out-of-doors with class discussion and experience chart record of habits and characteristics

e. Purchase of food and equipment for class pet

f. Class table for collection and display of animal related objects as incentive for discussion and learning (sample contents: eggshell, nests, cocoon, feathers, starfish, seashells, etc.)

g. Classification of animals as to whether they live in water, on land, or fly in the air; whether they can be found in the zoo, on the farm, in the woods; whether they are suitable or unsuitable for pets

h. Simple seatwork exercises on animal classification, pets, and animal covering

i. Write experience charts on animal study experiences

j. Write experience chart on safety with new pets and strange animals

k. Learn common names of animals in specific locale and domesticated animals

Culminating:

1. Pet show
2. Booklet containing experience charts or account of class pet project with photographs or drawings

SAMPLE EXPERIENCES WITH ANIMALS - PRIMARY LEVEL

Objective: To observe animal movement for purposes of learning methods of locomotion, feeding, and adaptation.

Equipment: The device is simple to construct and easy to store. It consists of six bricks; a flat, clear glass plate; and a large plane mirror (see figure below). In use, several of these units can be spread about in the room. Have the students place sow bugs, ants, and then earthworms on the glass plate and observe each animal's movements from above and below (reflected in the mirror). Lizards, tree frogs, and small snakes are especially interesting for this type of study. If the glass plate is moistened with just a small amount of water, snails can also be observed. Pupils can watch how snails overcome obstacles such as marbles, rulers set on edge in a small mound of clay, or thin layers of gravel and sand

PRIMARY LEVEL . . .

PLANTS

Primary Level

STUDY OF PLANTS

The study of plant life can serve to stimulate the children's interest in their immediate surroundings. Guidance for the retarded is needed to increase awareness of his environment. Pleasure in the beauty of nature, safety in relation to use and exposure to plant life and functional learning related to man's dependence upon animal and plant life are goals of study appropriate to the special class for the mentally retarded.

A listing of specific material to be presented during the teaching of units on plants should contain suggestions similar to the following: Food Producing Plants, Growing Plants for Beauty, How Plants Get Food, Seeds, How Plants Help Man, How Plants Help Animals, and Gardening.

General Objectives
For the Study of Plants

Primary Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:
    - A. The basic needs for plant life
    - B. The basic parts of a plant: roots, stem, leaves, flower
    - C. The fact that plants have similarities and differences
    - D. Plants as a possible source of beauty
    - E. The relationship of man and animals to plants
    - F. Necessity of conservation of certain plant life
    - G. The seasonal growth cycle of plants

II. To develop ability in relation to:
    - A. Recognition and beginning identify of plants needed by man

B. Care of plants

C. Recognition of basic ways in which plants grow

D. Basic functions of plant parts (i e., some plants will grow from seeds, some from roots)

E. Use of simple vocabulary related to plant life

III. To develop positive attitudes on the part of students which reflect:

A. An acceptance of the necessity of proper care of living things

B. An appreciation of beauty provided by plants

C. An appreciation of plants as necessary for survival of life

Activities
In the Study of Plants

Initiatory:

1. Use of an incident capable of motivating interest in plants (i.e., Spring gardening activities, Fall changes in trees and plants, discussion of flowers in classroom or on school grounds, study of food and curiosity as to origin of vegetables, etc.)
2. Field trip to observe plant life and to formulate questions to be recorded as goals for unit study
3. Stories about children's experiences with plant life
4. Collect flowering plants on field trip

Assimilating:

1. Field trips to residential areas, woods, parks, greenhouse, farm, or vegetable garden
2. Speakers such as farmer, gardener, or florist
3. Bulletin boards
    a. Plants which we eat
    b. Parts of a plant

    - c. What a plant needs to grow
    - d. Pictures showing animal uses of plants (food, shelter, protection, etc.)
    - e. Samples of plant parts from which new growth may be started (i.e., leaf of African Violet, stem of ivy, eye of potato, seed of flower, kernel of corn, root, etc.)
    - f. Pictures of flowers, trees, shrubs, for comparison of sizes

4. Related individual and group activities
    - a. Experiments with plants showing effect of light, degree of temperature, water, air, and type of soil
    - b. Write experience charts on plant experiments, class field trips and things learned
    - c. Show pictures of plants and plant experiments
    - d. Seatwork exercises on plant life and use
    - e. Perceptual experiences with plants: see, feel, smell
    - f. Grouping of flowers through sensory experience: by odor, by color, by touch, by size
    - g. Experiment with different plants to learn that number of seeds vary (i.e., apple-few, milkweed-many). Open and count seeds where capable.

Culminating:

1. Presentation of flowering plants, grown in class, to parent or other chosen person
2. Booklet on plant life

SAMPLE EXPERIMENTS ON PLANTS - PRIMARY LEVEL

Objective: To learn through observation that roots grow down.

Experiment: Make a visible germination garden by using two glass plates and a piece of blotter. Sprinkle four or five radish seeds on the blotter and place between the two pieces of glass. Secure with two rubber bands and place in a saucer of water on the window sill. As the seeds begin to sprout, you can examine them with a magnifying glass. Note the tiny hair-like roots. Notice that the roots will grow down. Turn your garden on one side and look at the roots each day. You will find they have changed direction so as to grow down again.

Objective: To learn through observation that stems grow up.

Experiment: Take any pot with small seedlings growing and place it on its side. Watch how the stem turns up.

Objective: To learn that plants grow toward sun and may be rotated for straight growth.

Experiment: Leave a potted plant in a window where it gets light only from one side. Watch how the plant seems to grow toward the light. Now turn the plant 180° and observe each day how it turns toward the light.

PRIMARY LEVEL . . .

WEATHER AND SEASONS

Primary Level

STUDY OF WEATHER AND SEASONS

Weather and seasonal changes are important areas of functional teaching because of their widespread effect upon human beings. Awareness of these environmental changes as they relate to the protection and comfort of children is of particular importance to the curriculum. Students should learn that many daily life activities and behaviors are affected by these changes. Natural opportunities to observe these changes can be anticipated in all climates. The vocabulary relevant to the teaching of weather and seasons has wide application and can also be emphasized in the teaching units outside the area of science. Sensory experiences may be utilized greatly in observing conditions of weather.

A listing of specific material to be presented during the teaching of units on weather and seasons should contain suggestions similar to the following: Autumn, Winter, Spring, Summer, Clothing, Weather and Animals, Weather and Plants, Air, and Water.

General Objectives
For the Study of Weather and Seasons

Primary Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:

   A. Seasonal changes

   B. Temperature as an indication of weather

   C. Varied weather conditions

   D. Simple water cycle

   E. Weather conditions

II. To develop ability in relation to:

   A. Names of seasons

   B. Proper dress for specific weather conditions

   C. Estimating thermometer readings as cold, hot, cool, warm

   D. Vocabulary related to common weather conditions

   E. The effect of weather and seasonal changes on living things

   F. Recognizing basic characteristics of air (i.e., has weight and can move things)

   G. How rain provides water for use by living things

   H. Observing clouds as one indication of weather conditions

   I. Safety in special weather conditions (snowstorms, ice, tornados, thunderstorms, etc.

III. To develop positive attitudes on the part of students which reflect:

   A. Acceptance of knowledge of weather as useful to man because of its effect upon his activity, comfort, and safety

   B. An increased awareness of environmental conditions for purposes of pleasure, safety and utility.

Activities
In the Study of Weather and Seasons

Initiatory:

1. Daily "weather report" as part of regular classroom opening activities
2. Exploratory walks in which conditions of weather and effects of weather are noted
3. Collection of questions on weather and seasons contributed through class discussion and experiences

Assimilating:

1. Field trips to a windmill or on exploratory walks through woods, open spaces, areas with buildings, schoolgrounds, etc., for observation of effects of wind, cloudiness, sun, heat, and cold.
2. Speakers such as a Science specalist or a local fireman (to tell how dry weather increases incidence of fire, how extremely cold weather affects fire fighting, how firemen protect themselves against weather conditions, etc.)
3. Bulletin boards
    a. Pictures of varied types of weather
    b. Representative objects and activities for four seasons
    c. Illustration of process of water - cloud to earth to cloud cycle
    d. Cut-out illustrations of effect of sun, rain, cold upon plant life
    e. Fabric or pictures representing clothing appropriate for specific weather conditions
4. Related individual and group activities
    a. Make a booklet on seasons with pictures and drawings appropriate for each
    b. Do seatwork exercises matching clothing and activity articles for appropriate seasons
    c. Use experience charts to survey different types of weather recorded over a period of several weeks
    d. Make weather illustrations for use on class-constructed calendar to record weather account
    e. Use experiments with sun, heat, cold, air, etc., to learn characteristics

f. Use over-sized simulated thermometer (i.e., zipper, painted red pasted on cardboard) for class experiments with reading temperature. Compare with real outdoor thermometer

g. Experiment with varied fabrics and colors (using thermometer) to show retention of heat

h. Observe and draw pictures of clouds when present. Discuss meaning of clouds, movement by wind

i. In autumn, have leaf collection, observe how very windy days cause many leaves to fall. Note change of color in various leaves

j. On very sunny days, observe shadows outside. When the sun is high the shadows are short, when the sun is low, shadows are long

k. Dramatize a situation in which weather presents problems to be solved (i.e., "caught in the rain")

l. Make cut-out people and clothes to dress, representing appropriate seasonal clothing. Have large model for daily class use

m. Summarize daily weather calendar at end of each week (i.e., how many days did the sun shine, when was it coldest and warmest, how many days of rain, etc.) Note what kind of clouds were present when it rained, snowed, or stormed.

Culminating:

1. Make a multi-phase mural showing varied weather conditions and changes affecting same scene containing plants, animals, people, houses
2. Have a display table for weather experiments. Invite another class to watch experiments with explanations guided by teacher

SAMPLE EXPERIMENTS ON WEATHER AND SEASONS - PRIMARY LEVEL

Objective: To learn that the sun gives off heat.

Experiment: Put a tin cover on a window sill in the sun, another in the shade. After a few minutes, compare how they feel. The same may be done with a dark piece of paper.

Objective: To learn that air can move things.

Experiment: Let children sit in circle at the table or on the floor. Put some bits of tissue paper in the middle of the circle. Let children blow through straws toward the paper. Vary the tissue paper with bits of wrapping paper, cardboard, wood chips, etc. Let the children give names to the amount of air necessary to move them. For example: "soft breeze," "windstorm," "strong breeze," etc.

Objective: To learn that moisture will evaporate or go into the air.

Experiment: Wipe a streak of moisture across the chalkboard with a wet cloth. Count and see how long it takes to disappear. Put two wet streaks of moisture across the chalkboard. Blow at one of them, or fan it. Which one disappears first?

Objective: To demonstrate water cycle.

Experiment: Heat water in glass beaker and let it collect on glass. Cool and watch water collect and drip down again.

PRIMARY LEVEL . . .

EARTH AND EARTH COMPONENTS

Primary Level

STUDY OF EARTH

At the primary level, the purpose of a study of the earth and its components is to lay foundations for later study. The concept of the size of the earth will be most difficult for students at this level to understand. They will probably accept the idea that it is larger than anything they will ever see. Knowledge of soil, sand, rocks, and water will involve more direct exposure to parts of their immediate environment than concepts of general earth components. However, the concept should be basically presented, as should the use of a globe and the statement of the earth as being round and surrounded by air. These ideas should be presented as things they will learn more about later, but pointed up whenever current news or local happenings relate to them. This social emphasis and use of such knowledge should be remembered by the teacher as goals for studying the earth.

A listing of specific material to be presented during the teaching of units on the earth should contain suggestions similar to the following: Land, Water, Air, Rocks, and Conservation.

General Objectives
For the Study of the Earth

Primary Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:

   A. The shape of the earth

   B. The size of the earth

   C. The fact that earth has soil, rock, and water

   D. The fact that the earth is surrounded by air

II. To develop ability in relation to:

  A. Comparison of size concepts: big and little
  B. Comparison of shape concepts: round, flat, square, triangle, rectangle
  C. Comparison of textures: smooth, rough, wet, dry
  D. Observing objects with realization that distance makes them smaller
  E. Recognizing the many forms in which water may be found (steam, ice, liquid) and shapes in which water may be (stream, lake, river, ocean)
  F. Vocabulary related to basic, common earth components
  G. The effects of interaction of water and soil
  H. The fact that air is necessary for life

III. To develop positive attitudes on the part of students which reflect:

  A. An appreciation of conservation practices as necessary to preserve the earth
  B. An acceptance of the basic idea that the earth is round, large, and made up of different kinds of matter
  C. An appreciation of pleasure derived from experiences with earth matter
  D. Interest and curiosity in natural surroundings

Activities
In the Study of the Earth

Initiatory:

1. Presence of world globe in classroom
2. Display of rock collection
3. Use of playtime in sand box, with clay or water to stimulate questions and interest

Assimilating:

1. Field trips such as exploratory walks to specific areas for viewing rocks of different sizes (those which children can stand on as well as some they may hold in their hands) and bodies of water (different sizes such as streams, lakes, rivers, where possible)
2. Speakers such as a person with rock collection to show children variety in sizes, shapes and textures
3. Bulletin boards
    a. Landscape pictures illustrating various types of earth surfaces: mountains, plains, valleys, bodies of water, deserts, etc.
    b. Samples of some things moved by air: seeds, leaves, milkweed, soil, cloud (use cotton), etc.
    c. Pictures and objects with contrasts in size, texture, and shape
4. Related individual and group activities
    a. Experiments showing that air cannot be seen, but is real and takes up space
    b. Experiments showing that air moves things
    c. Sandbox or work table play in which landscape is formed with mountains, valleys, hills, etc.
    d. Display or collect rock samples. Allow games of separating smooth rocks from rough rocks
    e. Compare consistency of soil, natural clay, and sand (show how water seeps through each type)

f. Discuss different kinds of land areas visited or lived in by students. If possible, provide pictures relating to each.

g. Use of senses to group rocks: color, feel, size, weight, sound when dropped, rocks that make marks, hard rocks, crumbly rocks

h. Write experience charts on experiments and exploratory walks

Culminating:

1. Review experience charts
2. Use field trips and walks to note incidents of learning from earth study

SAMPLE EXPERIMENTS ON THE EARTH - PRIMARY LEVEL

Objective: To understand that air is everywhere, though it cannot be seen.

Experiment: Have students fan the face with a piece of paper. Explain, "You feel something, but cannot see it. The paper did not touch you and there was nothing present before or after fanning that was not there when you fanned, so what you felt must be air."

Objective: To see that air occupies space.

Experiment: Provide balloons for class members to blow up, one at a time. Give opportunity for individual observations on what happens to the balloon, what individual does to it, etc. Lead students to understand that air went into the balloon, the balloon got bigger, because more space was needed for the air. Have class repeat what they have learned: air takes up space (or room).

Objective: To understand that the wind changes the earth's surface.

Experiment: Place a pile of sand in a carton that has one side cut away and watch how the pile (hill) is eroded away as you gently blow over the surface from the closed end. This should be preceded and proceded by trips to actual areas where erosion is evidenced, with reference to the classroom experiment as showing how this happens.

Objective: To learn that rain wears away rock and moves soil.

Experiment: Pile sand in a large pan. Take a sprinkling can or any perforated can filled with water and simulate rain falling on a hill. Watch how rivulets form and carry away the top soil. Use field trip to point up evidence of this wherever possible, relating it to classroom experiment.

PRIMARY LEVEL…

UNIVERSE

Primary Level

STUDY OF UNIVERSE

Concepts of space and what it contains (i.e., moon, sun, and stars) are abstract and difficult for the retarded child to grasp. Rather than to be discouraged by this fact, the primary teacher should view his Science instruction as an opportunity to guide the child's learning from simple observations and basic characteristics to the goal of increased awareness. This area should not focus on purely technical or factual information; rather it should stress the use of experiences in observation and the actual involvement of children.

A listing of specific material to be presented during the teaching of units on animals should contain suggestions similar to the following: Space, Moon, Stars, Sun: Heat and Light, Day and Night.

General Objectives
For the Study of the Universe

Primary Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:
   A. The fact that space surrounds the world
   B. That an object looks much smaller when it is far away
   C. That the sun provides light and is very hot
   D. The fact that the moon, stars, and sun are very far from earth

II. To develop ability in relation to:
   A. Recognition of the sun's contribution to living things
   B. The fact that too much heat may not be good
   C. Realization that appearance of size is related to distance

D. Space as important to modern scientific study

E. The length of daylight being caused by position of the sun in relation to the earth

F. Observing differences in moon, stars and sun

G. Basic vocabulary related to common references of the universe and what it contains

III. To develop positive attitudes on the part of students which reflect:

A. An appreciation of the beauty of the universe

B. An acceptance of the fact that the universe, stars, moon, and sun are larger than anything around us

Activities
In the Study of the Universe

Initiatory:

1. Demonstrations and experiments to illustrate the effect of distance upon appearance of size
2. Experiments with plants, dark paper, fabric to illustrate the heat of the sun
3. Demonstrations to illustrate the rotation of the world around the sun with models, balls, or students
4. Discussion and observation of the varied lengths of daylight through different seasons

Assimilating:

1. Field trips for outdoor observation of sky (caution students not to look directly into sun) and to an observatory, if available
2. Speaker such as science teacher to illustrate movement of earth, effects of sun, etc. (more technical areas to be simplified)
3. Bulletin boards

- a. Representation of universe with cut-outs of world, sun, moon, most familiar stars and constellations
- b. Pictures of modern space activities
- d. Illustrations of man's uses of the sun

4. Related individual and group activities
    - a. Experiments with sun heat
    - b. Collection of current events (from newspapers and magazines) related to space programs, eclipses, etc.
    - c. Experience chart accounts of observations, experiments, and learning
    - d. Take trip to high point (hill or tall building)
    - e. Compare length of day with recorded observations of amount of light when arising in summer and in winter

Culminating:

1. Review experience charts

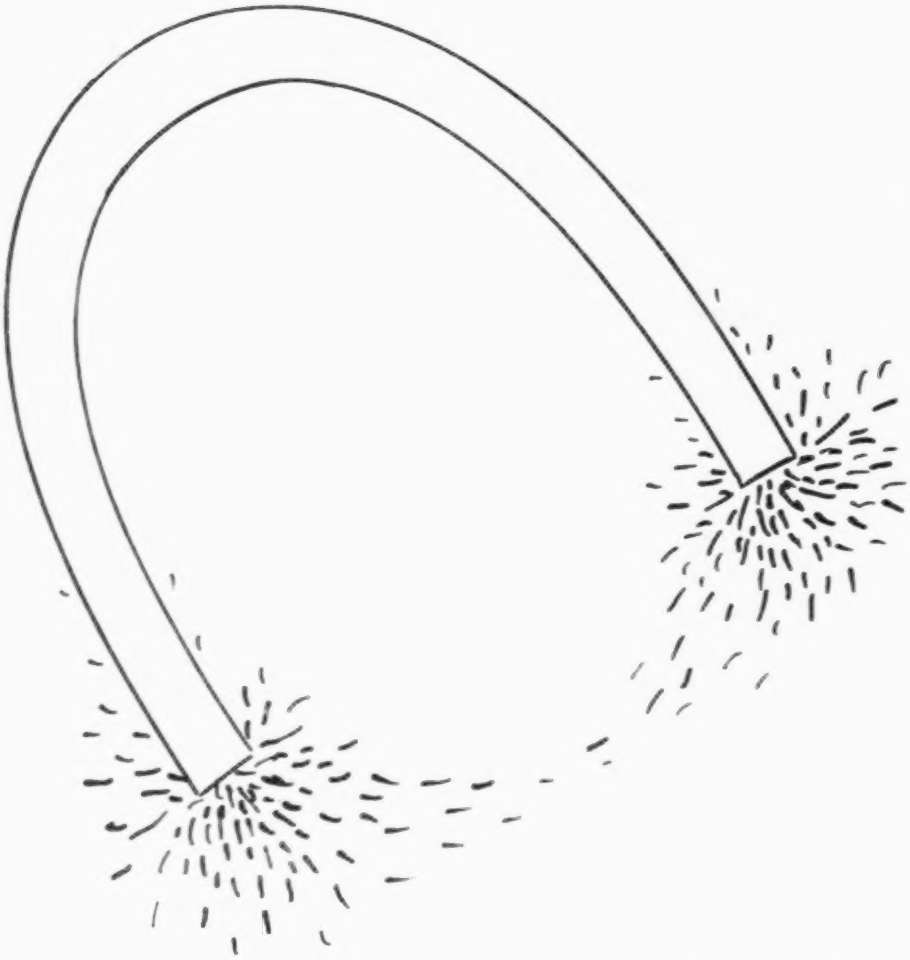
SAMPLE EXPERIMENTS ON THE UNIVERSE - PRIMARY LEVEL

Objective: To see how the moon gives light

Experiment: Have students hold a mirror at an angle to reflect the light of the sun or of a lamp on a wall or table. Explain that reflection from the sun hitting the moon provides light in the same manner.

Objective: To understand what causes day and night.

Experiment: With the lights out and the shades down, shine a flashlight on a globe of the earth. A flag may be used to pinpoint your own locale. Rotate the globe in a counterclockwise direc tion, pointing out that the lighted part indicates daylight, the unlighted, dark. Allow students to turn globe, move with flagged area, to grasp the concept more thoroughly.



PRIMARY LEVEL...

FORCES

Primary Level

STUDY OF FORCES

Included in the area of forces for the primary level are the subjects of fire, sound, electricity, friction, and simple machines. These are important areas of study which will relate to life activities and are thereby considered highly functional for the mentally retarded. Knowledge and abilities related to these subjects should be emphasized throughout a science program for the educable mentally retarded. Coverage on the primary level should provide an awareness of the importance of the forces to man, should stimulate interest and curiosity for further study, and should begin acquisition of basic skills in safety.

A listing of specific material to be presented during the teaching of units on forces should contain suggestions similar to the following: How Man Uses Fire, Safety with Fire, Sound, Simple Tools: Use and Care, Wheels, Safety Around Electricity, Electricity at Home and School, Magnets, Toys that Move, and Friction.

General Objectives
For the Study of Forces

Primary Level

I. To develop the ability to respond in social conversation or to identify through sensory experiences:

    A. Fire as a force which may produce good and bad effects for man and which may be controlled by man

    B. Sound as important to man for communication and knowledge

    C. The fact that electricity helps man in many ways

    D. Basic effects of magnets

E. Machines as valuable and important to man

F. The fact that friction is a force which occurs when two objects are rubbed together

II. To develop ability in relation to:

A. The fact that all fire needs air in order to burn

B. The fact that fire has many uses

C. The danger of fire

D. The fact that sounds may be loud or soft

E. The fact that sound comes from many sources

F. The fact that some things may be heard and not seen

G. Safety with electrical appliances and outlets

H. Basic functional uses of magnets

I. Vocabulary functionally related to forces studied

J. Recognition of simple machines

K. The care and use of simple tools

III. To develop positive attitudes on the part of the students which reflect:

A. A beginning appreciation and respect for work

B. An appreciation and respect for machines

D. An awareness of the necessity of safety habits in relation to fire, sound, electricity, tools and machines

D. A beginning appreciation of man's utilization of forces around him

Activities
In the Study of Forces

Initiatory:

1. Use of Fire Prevention Week to introduce unit on fire

2. Play a sound game in which students (with eyes covered) guess source of familiar sounds from recording or through imitations by other

students. Initiate questions about sounds.

3. Point up electrical objects in classroom (lights, radio, phonograph, aquarium filter, movie projector, etc.), asking students what makes them work. Suggest some other uses of electricity and promote questions to be answered by study
4. Have students bring a collection of moving toys for display and study of machines

Assimilating:

1. Field trips to a fire station; exploratory walk for listening experiences (have students note different kinds of sounds, loudness and softness); and if possible, construction site on which machines are used. (Pre-planning of trip with arrangements through personnel might include having a worker tell students of safety measures observed.)
2. Speakers such as a fireman, a machine worker to describe importance of safety on the job, or a science teacher for demonstration of magnets
3. Bulletin board
    a. Pictorial illustration of class and school fire drill regulations
    b. General rules for procedures in case of fire
    c. Pictures illustrating things being heard but not seen (i.e., telephone voice, radio, thunder, airplane above the clouds)
    d. Good rules for taking care of toys
    e. Illustrations of tools which Primary children might safely use, and care of them

    - f. Illustrations of simple machines (lever, wheel and axle, pulley)
4. Related individual and group activities
    - a. Discussion and dramatization of what to do in case of fire
    - b. Experiments showing that fire must have air to burn
    - c. Experiments showing that some materials burn and others do not
    - d. Booklet on ways in which fire helps man with simple statements to label drawings or pictures cut from magazine (i.e., "Fire keeps us warm, fire cooks our food, fire gives us light)
    - e. Experience chart accounts of observations and experiments on forces
    - f. Experiments with sounds
    - g. Experiences with magnets
    - h. Have students contribute to class list of electrical appliances in their homes. Make list of safety habits to be practiced with these
    - i. Have telephone practice in proper handling of the instrument
    - j. Class access to simple tools through table display and opportunity to use (hammer, nails, sandpaper, etc.)
    - k. Show friction producing warmth by rubbing hands together slowly, faster, and with varied degrees of pressure

Culminating:

1. Review experience charts

SAMPLE EXPERIMENTS ON FORCES - PRIMARY LEVEL

Objective: To learn that sound travels through solid things.

Experiment: Show class how to construct tin-can telephones to experience sound travelling through string. Use two cans. Remove one end from each can and punch a small hole in the other end of each. String a thread through the holes, securing it with a large knot or by knotting the string through a button. The cans are to be held by two children far enough apart to keep the string taut. While one child speaks into his can, the other child holds his can to his ear. Each student should have opportunity to participate in the experience.

Objective: To show that fire needs air.

Experiment: Light a candle, then place a glass over it. The fire is extinguished because it could get no air. Explain to students that this is the reason for learning not to run should your clothing catch fire (running gives more air to the fire). Rolling in a blanket shuts the air off from the fire. This is also the reason for closing windows when there is a fire drill.

Objective: To learn that sound is caused by vibration. (Explain and illustrate vibration prior to experiment).

Experiment: Put a rubber band around an empty cigar box without a cover. Snap the band and listen. Observe the vibrating rubber band. If you grasp the band, stopping its vibration, the sound stops. This is the principle of all stringed instruments.

Objective: To learn that magnets will attach to items containing iron or steel.

Experiment: Allow students to experiment with a bar magnet and any number of items such as nails, paper clips, coins, pins, pencils, chalk, fabric. Explain the force drawing the items to the bar as magnetism.

Objective: To learn that magnetism may pass through materials.

Experiment: Place several paper clips on a table and cover them with a piece of paper. Now, touch the paper with the magnet and at the same time lift both the paper and the magnet. Watch how both the paper and paper clips are lifted. (Let the students experiment with paper alone so they do not get the impression that magnets will lift paper). Another experiment for this objective: Place a coffee can on its side on top of a thin piece of wood such as a cigar box top. By moving the magnet under the wood you can roll the can back and forth.

Objective: To understand that a lever is a bar or pole that can help move or lift something.

Experiment: Have child see-saw with other children of various weights, then with the teacher. Guide the child to discover that if the teacher moves closer to the teetering point, he can be lifted.

Objective: To understand that the axle is the bar or pole [illegible] which a wheel is fastened.

Experiment: Use toy cars, trucks, wagons, and doorknobs to show students how axle and wheel turn together. Using the pencil sharpener, show that the handle (crank) turns the axle, which is the cutter. Remove the cover from the pencil sharpener, tie a string to one end of the cutter axle and tie a book to the other end of the string. Show the working force as the handle is cranked and the book is lifted.

Objective: To learn that a pulley makes it easier to lift heavy objects or to get things to high places.

Experiment: Observe raising of flag on outdoor flag pole (perhaps school janitor would accommodate in this). Explain to students how difficult it would be to place the flag at such a height every day, without the pulley. Have them think of heavy things which might be more easily lifted with this method (i.e. paint-filled buckets, tar to a roof, etc.)

Starter Unit

Primary Level

OUR PETS

This unit was originally written by Gretchen Holsten for a course in Curriculum Development for the Mentally Retarded at the University of Iowa.

I. SELECTION OF UNIT - OUR PETS

This unit was selected because children are acquainted with their own pets and it would be motivating to start the year with something that is familiar and interesting to them. They will feel more relaxed and free in school.

II. SUB-UNITS

A. Family
B. Home
C. Food
D. Clothing
E. Health Habits
F. Safety
G. Courtesy and Attitudes

III. GENERAL OBJECTIVES

A. To develop the ability to recognize that a pet is an animal which is not wild
B. To develop the ability to identify and compare members of some specific animal families
C. To develop the ability to identify animals in both early and late stages of growth (i.e., kitten, cat, chick, hen)
D. To evidence proper behavior and manners in public and as a guest
E. To use field trip experience to identify animals as young or as adult
F. To recite, list, and make art display of observations from field trip
G. To develop ability to make an appropriate home for a pet
H. To develop the ability to purchase pet food
I. To recognize different coverings of pets
J. To develop the ability to bathe pets which do not clean themselves
K. To recognize that pets need to sleep and exercise

L. To learn procedures which protect pets

M. To recognize acts of kindness which are appropriate with pets

N. To gain self-assurance in interpersonal relations by acting as host and hostess

IV. CORE AREA ACTIVITIES

A. Arithmetic Activities

1. Count the number of pets at home and on pictures
2. Make comparisons of pets - large, small; big, little; long, short
3. Figure cost for fish in an aquarium; cost for an acquarium; cost food
4. Measure the amount of sand and water needed for an aquarium
5. Make comparisons of cages - rectangular, square
6. Time when pets should be fed
7. Measure food for pets
8. Seasons so that they can determine when to give a dog a bath
9. Worksheets on counting pets, cages, etc.

B. Social Competencies

1. Plan a visit to a home or a farm where there are a few families of pets
2. Invite a class to see pet's homes made; invite class to pet show
3. Plan a visit to a pet shop to see homes and buy fish
4. Cooperate in taking turns in feeding the fish and check off
5. Plan a trip to the grocery store to examine food for pets

6. Plan a field trip to court house to see where we get a dog license

7. Children learn through experience the proper way to handle pets. Demonstrate

8. Make guests welcome at pet show

9. Prepare booklet on "Our Pets."

10. Demonstrate care of a pet at home

C. COMMUNICATIVE SKILLS

1. Write and illustrate experience charts

2. Use telephone to call farm, and veterinarian

3. Write an original story about a pet

4. Label members of pet families, food, pets, cages, etc.

5. Discuss likenesses and differences of pets and members of pet family

6. Listen to tape of veterinarian and pet sounds

7. Have children tell about the pictures of pets which they drew

8. Make a chart with day and name of child responsible for cleaning aquarium and feeding the fish

9. Writing thank-you's to places where they have visited

10. Dramatizing stories, poems, actions of pets, etc.

11. Use magazines to find pictures of pets, ads on food for pets

12. Tell what the covering of a particular pet looks and feels like

13. Viewing films and filmstrips on pets and care of pets

14. Discriminating colors of pets

15. Write sentences and missing words from experience charts
16. Write an invitation to another class to pet show
17. Learn oral and recognition vocabulary words
18. Listen to books, poems, and learn finger plays about pets

D. HEALTH

1. Have veterinarian talk on diseases of pets
2. Give a dog a bath in class
3. Demonstrate proper way to wash hands after holding pets
4. Plan food for a family of pets
5. Observe pets sleeping and exercising
6. Children share responsibility of keeping aquarium clean
7. Observe that animals need fresh water. Put two dishes of water outside the classroom and change one twice a day and the other dish never
8. Brush a dog or cat of loose hair
9. Prepare bulletin board on sleep habits of pets
10. Check pets homes in classroom and home to assure safety measures
11. Use toy telephones to call veterinarian in case of an emergency

E. SAFETY

1. Demonstrate safe places to put pet's food to keep away from small children, and pets
2. Demonstrate safe ways of handling the food of pets

3. Plan a trip to the courthouse to secure a dog license

4. Dramatize ways of handling pets safely

5. Dramatize meeting strange pets when alone and with your own pet

F. VOCATIONAL SKILLS

1. Care for pets in the classroom - responsibility

2. Emphasize following directions in care of pets

3. Buying their own fish for the aquarium

4. Filling out application for dog license

V. RESOURCE MATERIAL

Pictures of pets

Pets which can be obtained

Trip to pet store

Trip to the farm

Trip to the courthouse

Trip to the grocery store

Field observations in neighborhood

Flannel board and objects

Experience chart and paper

Samples of coverings of pets

Pictures, labels, and actual food pets eat
Posters of pet care

Models of pet's homes

Films and filmstrips

Animal stories and books

Bulletin board displays

Scrapbooks, paper, paste, pictures, magazines
Aquarium, sand, snails, fish, etc.
Calendar

Clock with moveable hands

Poems and finger plays

Easel

Free materials

Records & record player

Tapes & tape recorder

Models of pets

Slides & slide projector

VI. VOCABULARY

- animals
- babies
- fish
- clothes
- shell
- leash
- winter
- pen
- chicks
- hamster
- fish
- dog catcher
- hutch
- pets
- hatch
- water
- covering
- bath
- courthouse
- spring
- telephone
- dog
- turtle
- rabbit
- collar
- wild
- trip
- water plants
- fur
- exercise
- veterinarian
- summer
- pony
- puppies
- snails
- family
- rabies
- mother
- guest
- food
- scales
- play
- home
- (colors)
- horse
- cat
- parakeet
- stable
- feather
- father
- aquarium
- grocery store
- hair
- license
- fall
- cage
- chickens
- kitten
- canary
- kennel
- inch

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
1a. To recognize that a pet is an animal which is not wild.	Use prepared tape of pet sounds and provide appropriate pictures. Let children respond freely as to what the sounds are.	Tape Recorder Prepared tape of pet sounds	Drawing of a few pets.
	What kind of animals are the lamb, the dog, etc.? (Pets)	Pictures of pets	Our Pets It is nice to have a pet. A pet is an animal which is not wild. We have many different pets. Pets are fun.
	Show pictures of various animals and ask, "Would this be a good pet?" Discuss. (Use at end of unit again.)	Pictures of animals	
	Let children tell pets they have at home; how many they have; names of pets. Write pet and name on the board beside child's name	Blackboard, chalk	
	Experience chart	Experience chart paper	
	Read poem: "Little Pussy" p. 103 in Poems and Rhymes "I like little Pussy, Her coat is so warm; And if I don't hurt her, She'll do me no harm. So I'll not pull her tail, Nor drive her away, But Pussy and I Very gently will play."	Poems and Rhymes Childcraft, Vol. I; Field Enterprises Educational Corporation, Chicago, 1967	
	Learn Finger Play: "Kittens and Puppies" "One little, two little, three little kittens, (Hold up 3 fingers of the other hand, one at a time.) Said, "Come let us all have some fun!" Up to the kittens the puppies went creeping (Move puppy fingers very slowly) As quiet as quiet could be. One little, two little, three little kittens. Went scampering up a tall tree! (Move kitten	"Kittens and Puppies"; Kindergarten Keys: A Curriculum Guide for Kindergarten Teachers; Champaign Comm. School District #4; Champaign, Illinois; 1965	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	fingers very rapidly.) Seatwork: Have children draw and color their pet(s). Those who have none, may choose one that they would like to have. Label picture with pet's name - put on bulletin board entitled "Our Pets" with picture under each student's name. Vocabulary: animals, pets, wild	Crayons Manila paper Bulletin Board	
2. To identify and compare members of some specific animal families	Review concepts of previous lesson by reading names of the children's pets on the bulletin board. Introduce rabbit family on flannel board. Count the number of pets in the family. Refer to the family members as mother, father, and young. Show name of the family. Discuss that these come from the mother while the chicken family (display on flannel board) was hatched from an egg. Show picture of a chick coming from an egg. View movie: "Baby Animals" University of Iowa. Write experience chart. Read orally. Read book: The True Book of Animal Babies Review finger play: "Kittens & Puppies" Seatwork: Duplicate experience chart and leave out the following words: mother, father, chicken, young. Have them draw a young pet on the bottom. Vocabulary: mother, father, young, hatch	Bulletin board Flannel board Rabbit family and chicken family for flannel board Experience chart paper Ditto master Film: "Baby Animals" U-2956 11 min. $1.65 B/W; Audio-visual Center, Division of Extension & University Services, Univ. of Iowa, Iowa City, Iowa The True Book of Animal Babies; Illa Podendorf; Children's Press	(Picture of a family of pets) Pets Have a Family Pets have a mother, father, and young. A chicken comes from an egg. A rabbit comes from the mother. The mother pet takes care of her young.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
3. To identify animals in both early and late stages of growth	Review experience charts Our Pets and Pets Have A Family.	Experience charts	(Picture of a young pet and grown-up pet.)
	SVE pictures "Farm and Ranch Animals" (horse & colt, hen & chicks, sheep & lamb) or CES pictures "A Trip to the Farm" (horse, cow, chickens, sheep) or Picture file of young animals with parents. Discuss the likenesses and differences between the parents and the young. Expecially bigger and smaller. Show a picture of a baby and let them compare how the children looked then and how they look now. Discuss the things that made them grow.	Our Pets and Pets Have a Family; Set SP-106 Farm and Ranch Animals; Society for Visual Education, Inc.; 1345 Diversy Parkway: Chicago, Ill. 60614; ($8.00 set)	Our Pets Grow Young pets grow. Pets look like their mother and father then. Our pets eat, sleep, and play to grow. We grow too.
	Show the pictures of the pets again and have children tell the names of the young and parents. Point out differences - cat, kitten; hen, chicks. Dramatize: "Growing Up" p. 41, Life Around Us; revised.	"A Trip to the Farm" A1535; Creative Educational Society, Inc.; Mankato, Minn., 56002; $1.98 set.	
	"As you grow up, you change in many ways. It is the same with animals. An animal grows until it is, As tall as a tree, Or as big as an ox, Or as fat as a pig, Or as strong as a bull, Or as fierce as a lion, Or as graceful as a cat, Or as sly as a fox, Or until it is as grown-up as it can be.	Picture of baby (human) "Life Around Us" Childcraft, V.4: Field Enterprises Educational Corp., Chicago, 1967.	
	Write experience chart	Experience chart paper	
	Read: All Kinds of Babies and How They Grow and Green Eyes	All Kinds of Babies and How They Grow, Millicent Selsam;	Rules for Our Trip 1. Stay with your partner.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	Plan trip to the farm to see young animals. (Alternative to: trip to home of someone who has a pet who has had young.) Decide what to say when we ask to visit. Call in class. Mark date on calendar. Seatwork: Worksheet #1. Cut out young and paste on top of parent's picture. Color. Vocabulary: grow, eat, sleep, play	William Scott: New York, 1953. Green Eyes, Abe Bernbaum Capitol Publishing Co.: Irvington, N.Y., 1953. Telephone Worksheet #1 Paste, scissors, crayons	2. Sit down on the bus. 3. Listen to the man at the farm. 4. Do not touch anything unless told you may. 5. Thank the man when you leave.
4. To evidence proper behavior and manners in public and as a guest	Review by having each child go to the bulletin board and tell the name and kind of pet he has. Review experience chart Our Pets Grow. Count the days until the field trip. Dramatize how we should act when we're on the bus and when we're a guest. Discuss pictures of pets that we will see at the farm. Write experience chart. Learn song: "Baby Chicks" p. 104. The Magic of Music 1. Seatwork: Worksheet #2 reviewing concept of distinguishing a pet Vocabulary: thank-you, trip, rules, guest	Bulletin board Chart: Our Pets Grow Pictures of pets on farm Chart paper The Magic of Music: Book One, Ginn and Co.: New York, 1965 Worksheet #2	

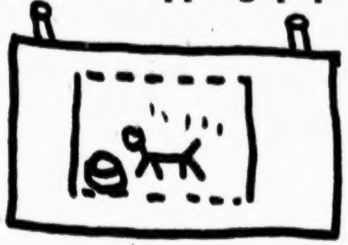
OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
5. To use field trip to identify animals as young or as adult	Stress experience chart: Rules for Our Trip Review pet pictures of those to be seen. Take trip Check rules off as to whether they were accomplished when class returns from trip	Experience chart Rules for Our Trip Pictures of pets on farm Field trip to farm	
6. To recite, list and make art display of field trip observations	Discuss trip: things which we saw, things we did, things we enjoyed. Write experience chart about trip. Write a brief thank-you to the farmer on blackboard; copy to paper; have children sign their names Seatwork: Make a cardboard box diorama of pets seen on the farm The open side of the box becomes the front. The top may be open or not. The background (inside the back of the box) can be painted, decorated with cutouts, or papered. Extend this decoration to the side too. The pets in the background may be colored on or pasted onto the back. The pets in the front should be stand-ups. These can be made from construction paper. The bottom of the box can be covered with construction paper. The bottom of the box can be covered with construction paper to represent grass, if desired.	Experience chart paper Blackboard, chalk Paper 8½"x11" Envelope, stamp Large cardboard box Crayons Scissors Construction paper Paste Paint	Our Visit to the Farm We went to the farm. We saw the young animals and the mothers. We held the new puppies. Mr. Granger showed us the mother pigs and the young pigs. We had fun.
7. To make an appropriate home for a pet	Review past experience chart: Our Pets Need a Home Bring out empty aquarium and ask children what they think that we could use this for. Discuss. What else is needed in order to put fish in the aquarium.	Experience chart Our Pets Need a Home Aquarium	(Drawing of an aquarium) Making Our Aquarium We are going to make a home for fish. We put sand, water and

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	Review measuring 1" from arithmetic View film: "A Balanced Aquarium"; 11 min. Discuss procedure for making an aquarium Write experience chart Have children prepare the aquarium. Wash coarse sand in boiling water. Put sand in the aquarium and measure 1". Put a piece of wax paper over the sand to prevent stirring up. Fill with water to within 1" of top. Add water plants Vocabulary: aquarium, fish, water plant, water	Film: "A Balanced Aquarium;" Encyclopedia Britannica Films; 7150 Wilmette Avenue, Ill. Chart paper ruler coarse sand large piece of wax paper water water plants	water plants in the aquarium. We must wait 2 days to buy our fish.
8. To gain understanding that pet's homes must be clean	Review procedure used to make an aquarium Review date on calendar for trip to pet store to get fish and see the homes. Count the days Display a bird cage used before, but show it not cleaned. Ask children if this is a good home for a bird. What can be done to keep it clean? How often? Display aquarium. Stress care in not touching fish; what to do with fish when cleaning tank Demonstrate how to clean the bird cage and the aquarium.	Bird cage Aquarium Children's model of homes Duty chart Chart paper Writing paper Booklet covers Fabric or corrugated paper	Keeping Pet's Homes Clean Today we learned how to keep our pet's homes clean. We must clean them once a week or more. We put the pet in a safe place while cleaning. We use fresh water to clean the home.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	Have children bring the homes they made for pets (see Learning Aids #1.) and demonstrate how they would keep their cage clean. Assist.		A clean home keeps our pet healthy.
	Add responsibility of cleaning the aquarium to the duty chart (see Learning Aids #2).		
	Write experience chart		
	Seatwork: Have them copy one sentence from the chart; draw a picture of a clean cage. Finish booklet cover which has traced pet from fabric or corrugated paper glued onto drawing or construction paper.	glue or paste	
9. To develop an understanding of food that pets need	Review chart: Pets Need Food To Grow. Examine the display of cans and boxes of actual food that we feed our pets. How will we know whether it is food for a dog or a cat? Can we always tell? Could we ask someone? What foods do our pets need to eat?	Chart: Pets Need Food to Grow Cans and boxes of pet food	Pets Eat Different Foods Our pets eat many kinds of food. All pets like fresh water. The food must be fresh. We can get the food from the grocery store or pet store.
	Use flannel board with pets and pictures of foods needed. Put names of pets on flannel board too	Flannel graph; objects of pets and pictures of foods needed	
	Add duty of feeding the fish to the duty chart	Flannel board Duty chart	
	Plan a trip to the grocery store to see the animal food that they have. What pet food will we look for? Make a list to be checked off when at grocery store (transfer to paper later).	Blackboard, chalk Chart paper	
	Write experience chart. Read orally	Finger play	

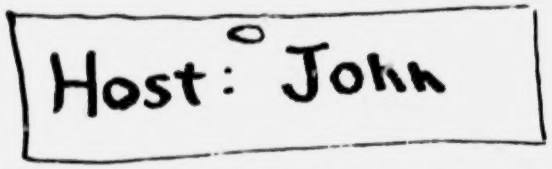
OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	Learn finger play. Seatwork: (Learning Aid #3) Vocabulary: food, grocery store	Pictures of pets	
10. To recognize different coverings of pets	Bring out "touch box." Blindfold one person and have them reach in and bring out something. Instruct others not to tell. Blindfolded child feels and guesses what it is. Do until box is empty. Discuss, with aid of coverings which all may touch and pictures, that not all pets have the same covering. Label each with picture, covering, and name of pet What happens when we have cats and dogs around us? Do they lose their hair? Do you ever get any on you? Is it good to sleep with pets? Discuss color of coverings, compare with color chart (Learning Aid #4) Write experience chart Read poem with picture of shaggy dog: p. 59. "The Hairy Dog" "My dog's so furry I've not seen His face for years and years; His eyes are buried out of sight, I only guess his ears. When people ask me for his breed I do not know or care:	Touch box with animal coverings--rabbit fur, feather, scale, hair from dog and cat Pictures of pets Color chart Chart paper Picture of shaggy dog *Sung Under the Umbrella, Macmillan Co.: New York, 1961 When Animals Change Clothes, Charles May; Holiday House; none; 1965 Duplicated worksheet #3	(Paste a feather, some fur, a scale to bottom of the chart). Pets Have Clothes Our pets have different kinds of clothes. We call these coverings. Some have fur and some have hair. A fish has scales and a turtle has a shell. Pets lose their covering, but grow a new one. We have to change our clothes, but pets do not.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	He has the beauty of them all Hidden beneath his hair." Horbart Asquith Read book: When Animals Change Clothes Pages 7-9 and 11-17 Seatwork: Worksheet #3 Vocabulary: clothes, covering, fur, scales, hair, shell, feather		
11. To develop ability to bathe pets which do not clean themselves	Review chart: Pets Have Clothes How do we keep clean? How often do we take a bath? Do you ever give your pet a bath? Discuss different pets and determine whether we give them a bath or they give themselves one. Show picture of cat licking himself How often should we give a dog a bath? Bring out calendar and show that a good time to give a dog a bath is at the end of the summer and at the end of winter. Review seasons Discuss what we need to give a dog a bath and write on board. Discuss the procedure of giving a dog a bath. (Give bath next day in class.) Write experience chart	Chart: Pets Have Clothes Picture of cat cleaning himself Calendar Chart paper	Giving A Dog a Bath 1. Put warm water and dog soap into a large pan. 2. Hold the dog in the pan so he won't get away. 3. Have someone else scrub him. 4. Rinse the soap off with warm water. 5. Dry him with a towel.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
	Seatwork: Make a filmstrip on how to wash a dog. Have children make from a cardboard box. Color the pictures in the correct sequence on white wrapping paper  Vocabulary: rinse, bath, clean, scrub	Cardboard box White wrapping paper Crayons Pencils Two dolls Scissors	
12. To recognize that pets need to sleep and exercise	Elicit discussion from bulletin board display (Learning Aid #5) Discuss why we need sleep and why pets need sleep. Show colored slides on pets sleeping Discuss why pets play and why children play. Show colored slides on pets exercising Play "Who Am I?" Have children pick a pet and show others how they move or run and have the others guess what pet it is Write experience chart Read book: A Time For Sleep: How the Animals Rest. As it is read have all children dramatize. Seatwork: Have children write title of experience chart on a piece of paper and illustrate for their booklet Vocabulary: sleep, grow, play, exercise	Bulletin board Slide projector Slides on pets sleeping and exercising A Time For Sleep: How the Animals Rest, Millicent Selsam; William Scott, Pub.: New York, 1958 Plain paper Crayons	Pets Need to Sleep and Play Pets need to sleep to grow. We grow when we sleep too. Pets need to play to get exercise. Exercise makes them grow. We grow if we exercise. (Drawings of pets sleeping and exercising done by children on bottom of the chart).

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
13. To learn procedures which protect our pets	Bring out a leash, dog collar, dog license and bell. Discuss what we use these for. Emphasize why these protect our pets	Leash Dog collar Dog license Bell	
	Ask how many of their dogs have a license. Do they know where they got the license?		
	Show a picture or drawing of the local courthouse. Explain that we can get them here if we live in town. If we live in the country a man comes to our farm.	Picture or drawing of courthouse	
	Discuss what we would do to ask for a dog license. Write on the board. Role play by having one person behind the desk and another asking for a dog license. Have each child give his name, address, name of pet, and telephone number. Write this on the board or on the experience chart. Discuss word application	Blackboard, chalk or Experience chart	
	Plan for trip to courthouse to ask for a dog license. Review rules for field trips		
	Seatwork: Worksheet #4 on filling in name, address, pet's name and telephone number from blackboard or experience chart. Add to booklets	Duplicated worksheet #4	
	Vocabulary: license, leash, courthouse, own name, address, telephone number and pet's name, application		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
14. To recognize acts of kindness which are appropriate with pets	Encourage children to tell or demonstrate a trick or clever thing that their pet can do. Talk over the fun that we have with our pets Discuss: How a dog acts when we come home from school, when we refuse to play with him, when you have been naughty or teased him. Does your parakeet entertain you with stunts when you pay attention? View filmstrip: "My Bunny? n 26H, Eye Gate Write experience chart Learn song and actions: "Little Dog, What Do You Say?" Ginn Read: Marshmallow by Clare Newberry Evaluation: Discern children's learnings from this unit. Review old finger plays learned in the unit. Review a few experience charts. Dramatize some learnings. Discuss pictures and sounds that were in the beginning of the unit. Vocabulary: tricks, tease	"My Bunny" n 26H, Eye Gate House, Inc., 146-01 Archer Ave., Jamacia, N.Y., 11435. $5.00 "Little Dog, What Do You Say?" P. 143, Ginn and Company: Boston, 1959. The First Grade Book Marshmallow, Clare Mewberry; Harper & Brothers: New York, 1942 Unit learning materials to be used in evaluation	Kindness To Pets A pet is fun when we are kind to him. We must not tease or get him angry. We should play with him a lot. We can teach our pets new tricks.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
15. To gain self-assurance in interpersonal relations by acting as hosts and hostesses	Read answer to invitation to another class to come for a pet show. Discuss this with children. How we answer all invitations which we receive, whether we plan to attend or not	Answer to invitation	Our Pet Show We are going to be hosts and hostesses to Miss Smith's class. We will have a pet show and a parade. We will serve them animal cookies and lemonade.
	Review how we treat our guests. Bring up words host and hostess. Discuss our obligations. Dramatize		
	Read book: May I Bring A Friend? by Beatric Schink de Regniers	May I Bring A Friend? Beatric Schink de Regniers Antheneum: New York, 1964	We have had fun with learning about pets.
	Write experience chart. Read orally		
	Have children practice pet show and parade	Chart paper	
	Have some children measure water for lemonade and others finish other work for the pet show	Water, lemonade	
	Let all children make tags from oaktag which say Host/Hostess and their name 	oaktag crayons scissors	
	Vocabulary: host, hostess, guests, invitation		

FUTURE OF THE UNIT

I have presented my lesson plans from several units which are not necessarily to be taught follow-each other, except the first six. Following is their presentation. They will be filled in where there are spaces.

SUB-UNITS

Family: Lessons 1 - 6 (in sequence)

Home: Lessons 7 - 8 (in sequence)

Food: Lessons 9

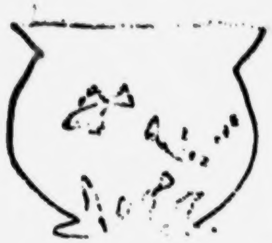
Clothing: Lessons 10 - 11 (in sequence)

Health: Lessons 12

Safety: Lessons 13

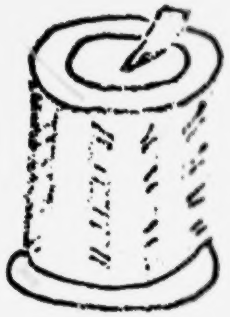
Courtesy & Attitudes: Lessons 14 - 15
(Not in sequence)

FISH BOWLS



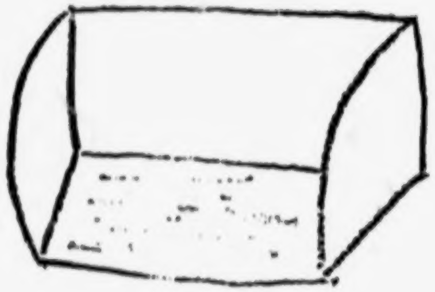
Cut folded wax paper in the shape of a fish bowl. Cut fish and seaweed of colored paper. Place them between two sheets of wax paper and press with a warm iron.

BIRD CAGES

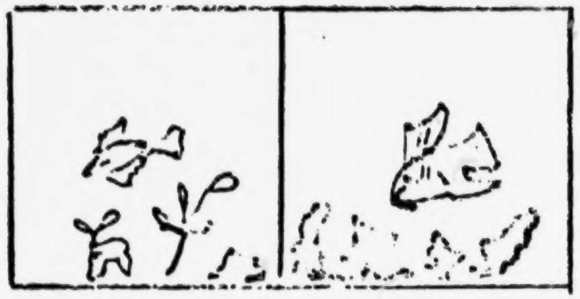


Make from two paper plates and drinking straws. A large needle and string can be used to sew through straws and plates. Hang.

DOG or CAT BED

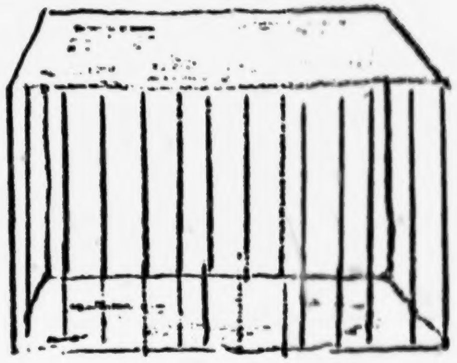


Dog and cat beds can be made by cutting down cartons and letting children sew paddings.



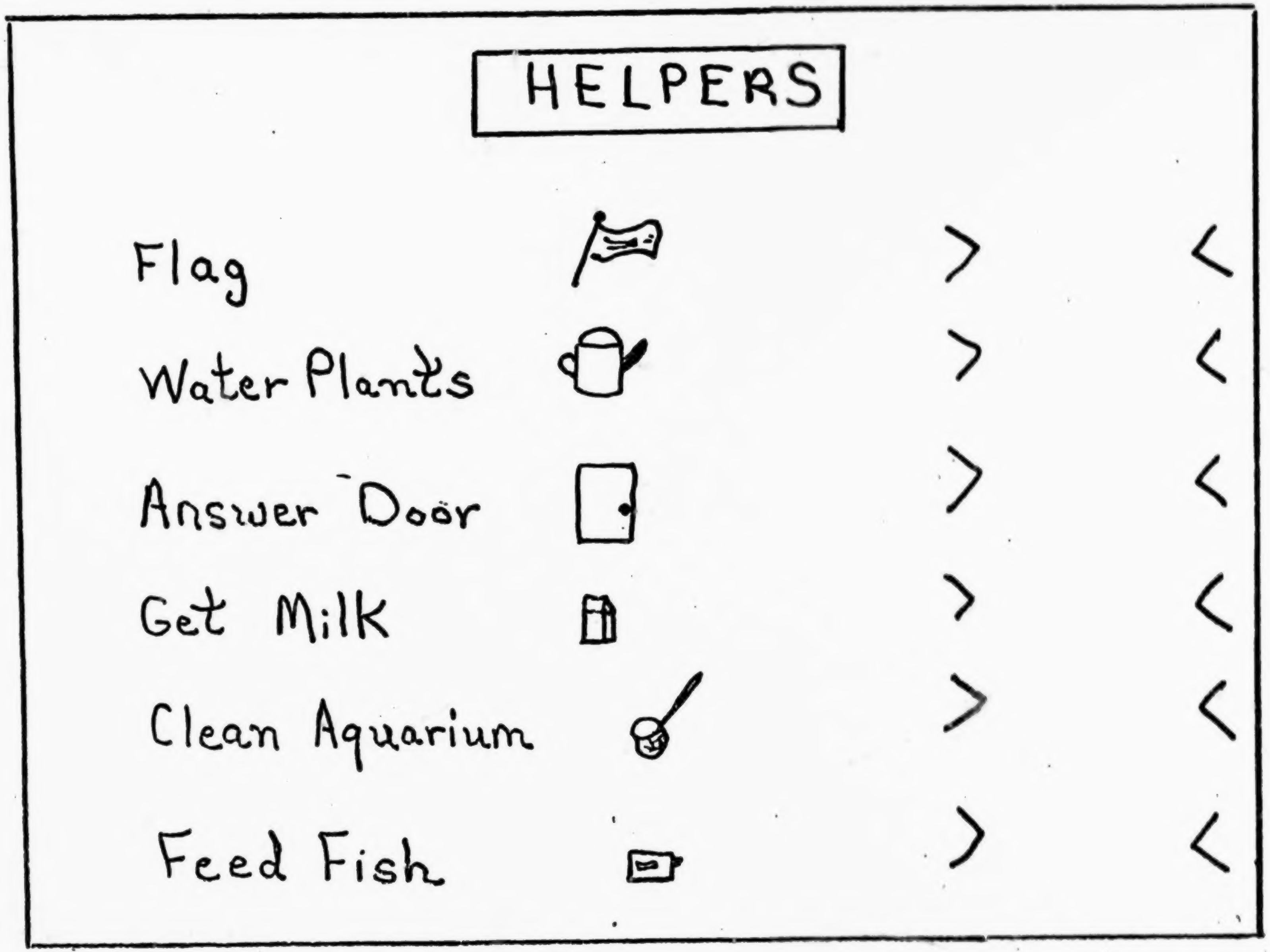
Windows make a good aquarium. Let children draw goldfish, angel fish and other kinds. They cut paper to make sea weed. These were taped to window panes. Real shells added to the effect.

HAMSTER CAGE



Use shoe boxes for the cage. String can be used as the bars.

LEARNING AID #1


HELPERS
Flag
Water Plants
Answer Door
Get Milk
Clean Aquarium
Feed Fish

MARY

Put in wing
slots with
children's
names on

LEARNING AID #2

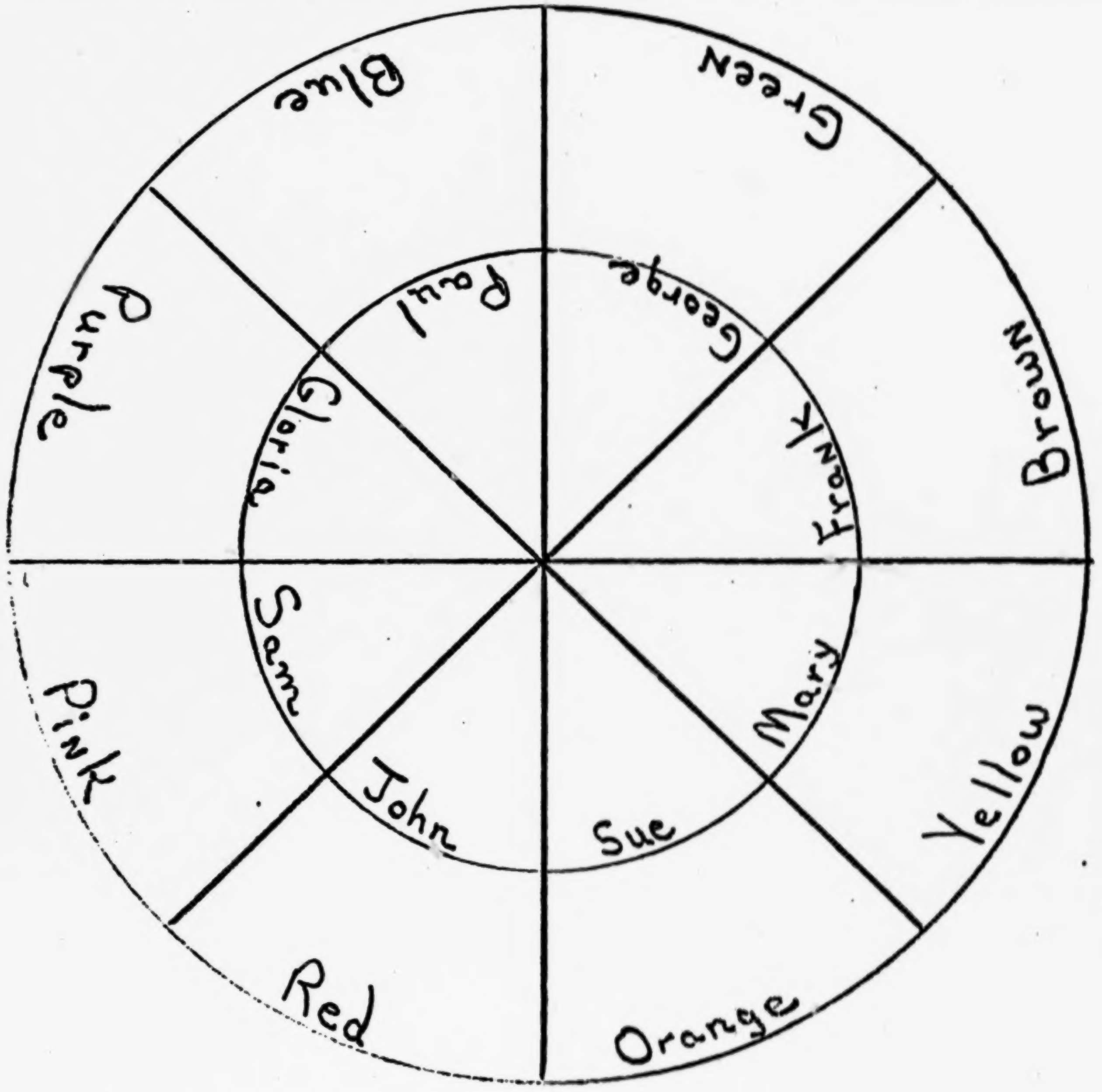
FINGERPLAY: "There Was a Little Turtle"

"There was a little turtle,	(Make circle with hands)
He lived in a box,	(Make a box with both hands)
He swam in a puddle,	(Wiggle hands)
He climbed on the rocks.	(Climb fingers of one hand up over other)
He snapped at a mosquito,	(Clap hands)
He snapped at a flea,	(Clap hands)
He snapped at a minnow,	(Clap hands)
He snapped at me.	(Point to self)
He caught the mosquito,	(Hold hands up, palm facing forward; quickly bend fingers shut)
He caught the flea,	(Same as above)
He caught the minnow,	(Same as above)
But he didn't catch me."	(Bend fingers only half way shut)

SEATWORK: Matching Game

Play matching game in class. Each child has a picture of a pet or a can of pet food. The children with the cans of pet food decide and call together which animal they want. "Where is the d o g?" The child with the picture of a dog comes up and tried to find the child with the dog food. He says, "I am a dog. I will eat you." If he is correct, he takes the can of food and the child with the food takes the picture. If he is incorrect, he sits down until he is called on again.

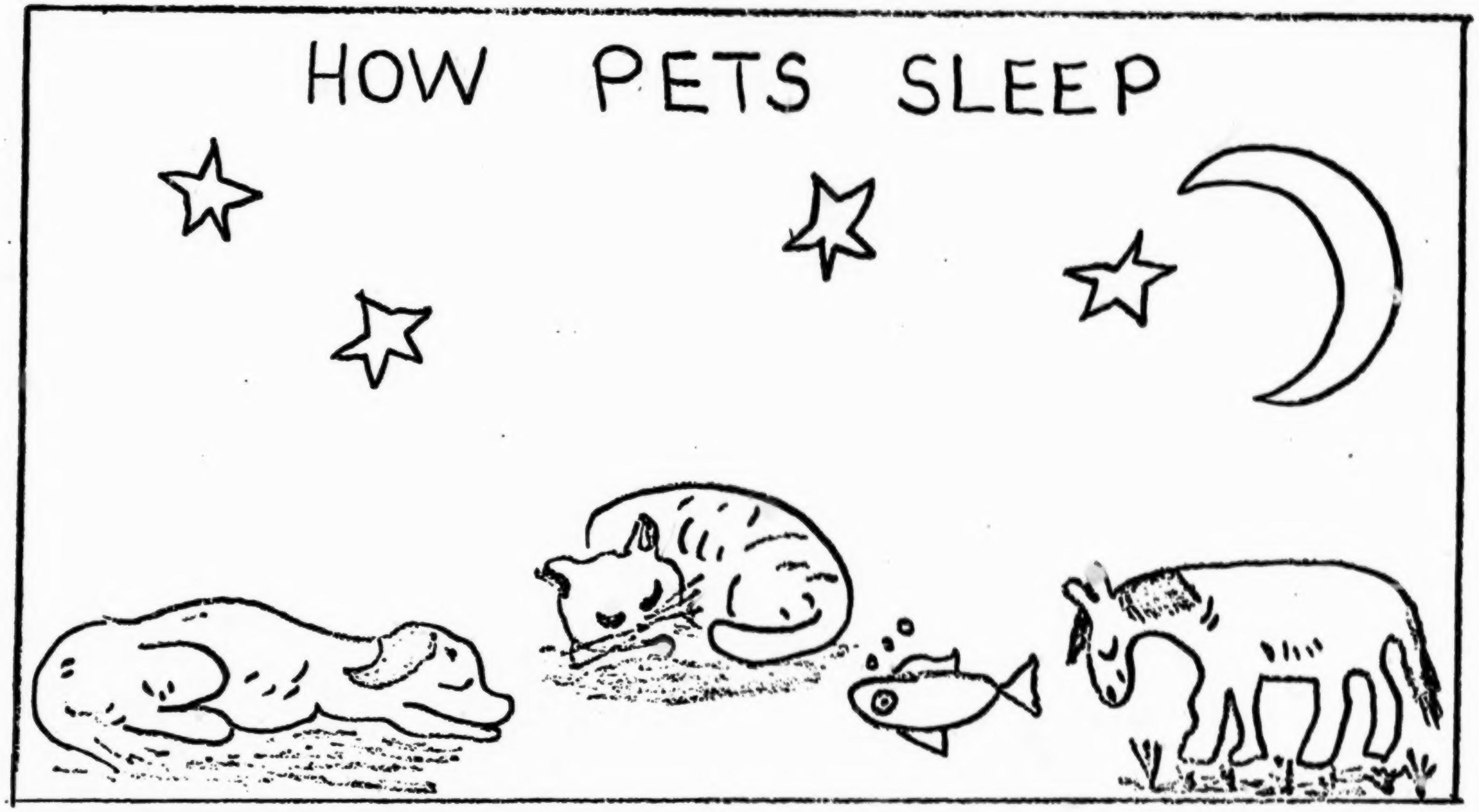
LEARNING AID #3


Blue
Green
Brown
Yellow
Orange
Red
Pink
Purple
Paul
George
Frank
Mary
Sue
John
Sam
Gloria

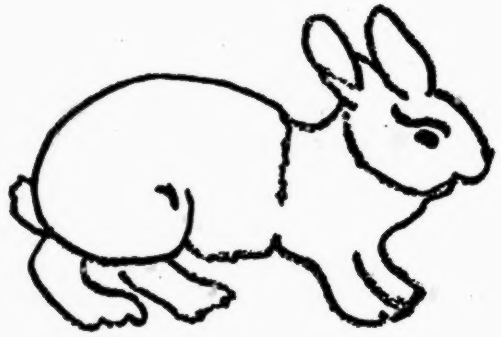
COLOR WHEEL

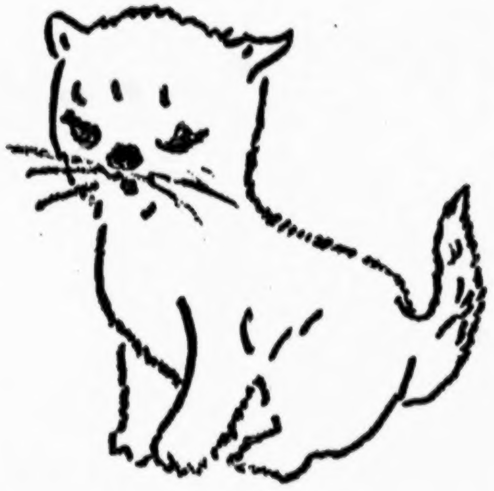
Make this color wheel on oaktag. Use primary and secondary colors. Paste a picture of a pet on the wheel of the appropriate color. Put an overlay of a wheel on top of this one with the children's names in each spoke and turn daily. An inch or half-inch tack could be put in the middle so it could turn on the bulletin board.

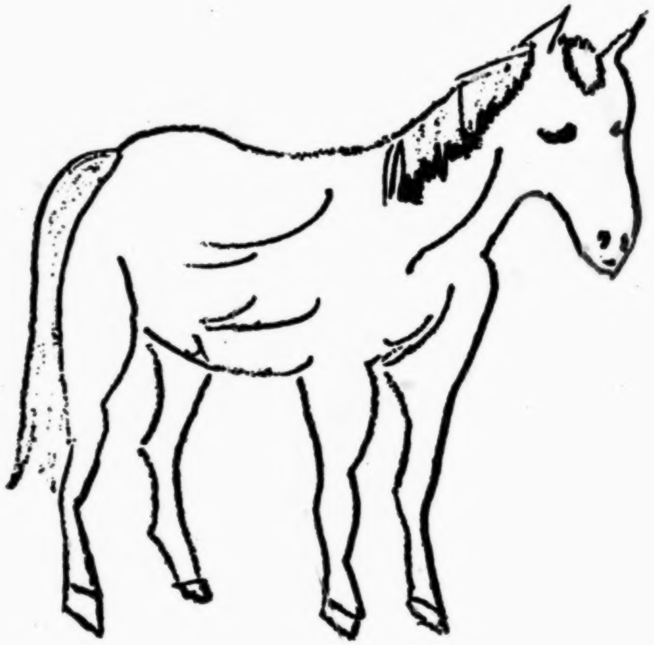
LEARNING AID #4

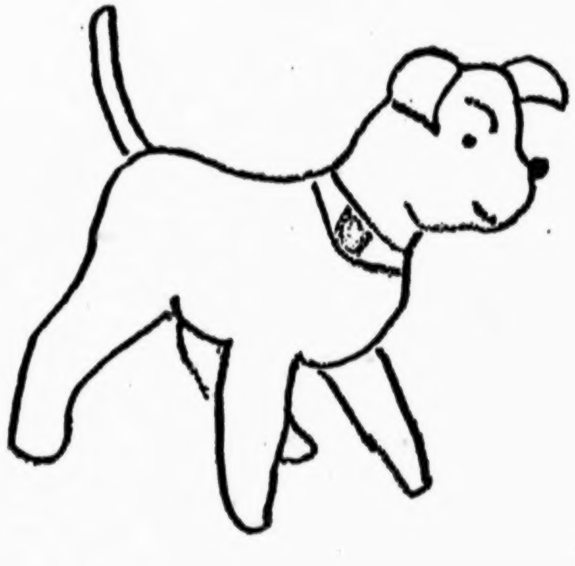

HOW PETS SLEEP

LEARNING AID #5

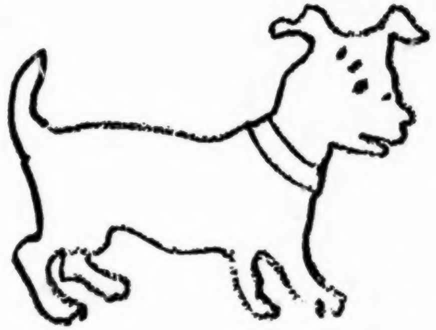


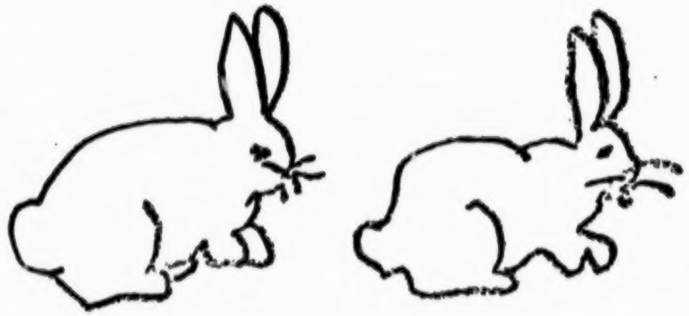


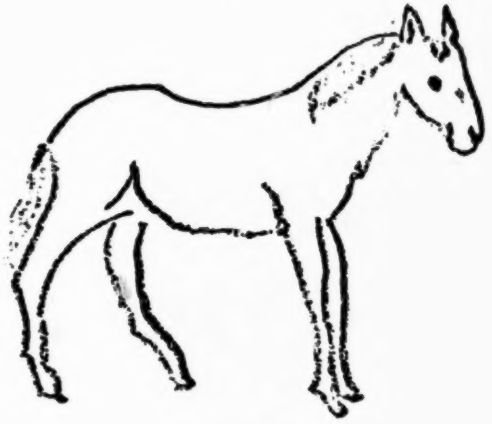


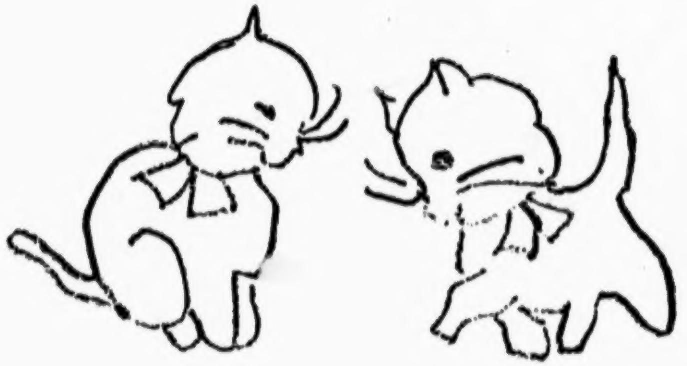


WORKSHEET #1a







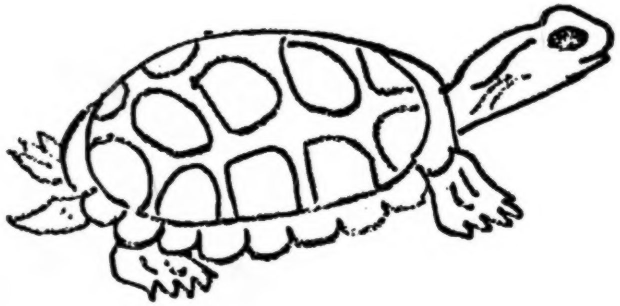


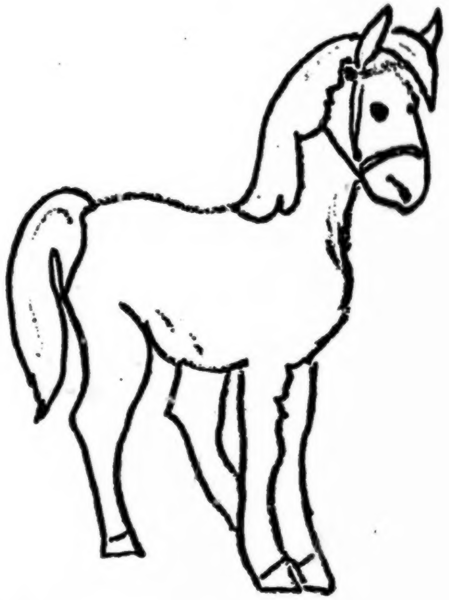
WORKSHEET #1b

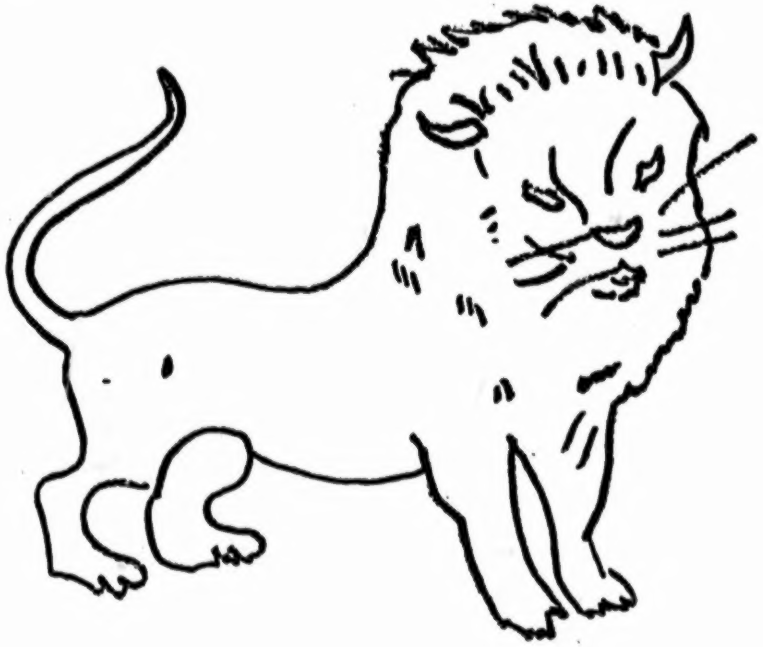
OUR PETS

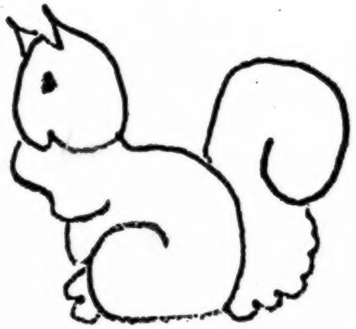
PUT AN X ON ANIMALS THAT DO NOT MAKE GOOD PETS

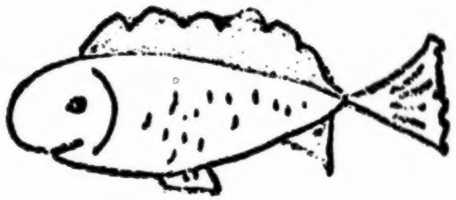
COLOR OUR PETS

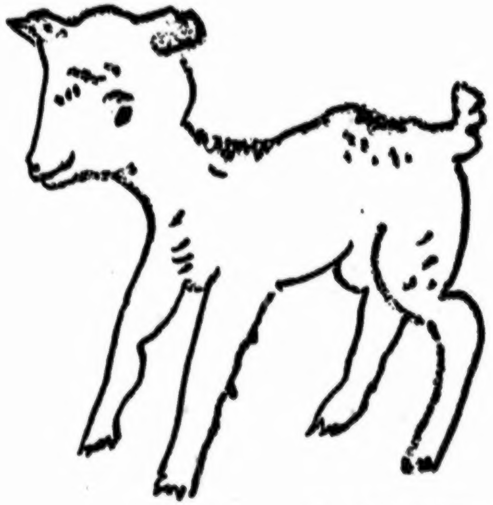










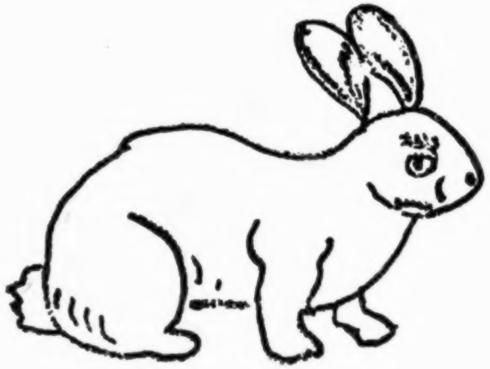


WORKSHEET #2

WHAT AM I?

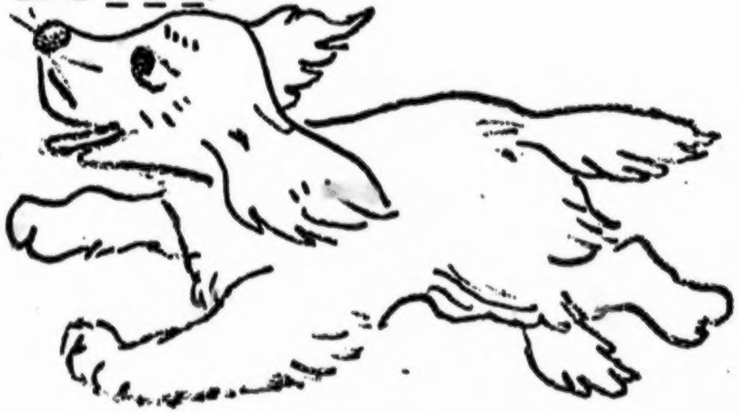
I have fur.

I am a ______.



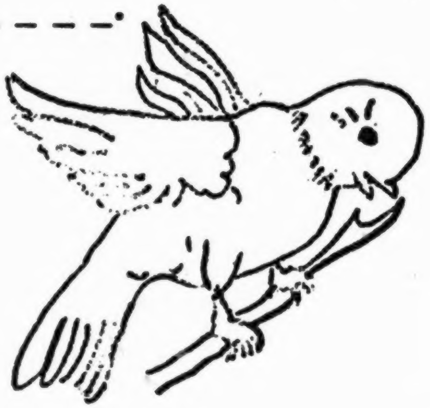
I have hair.

I am a ___.



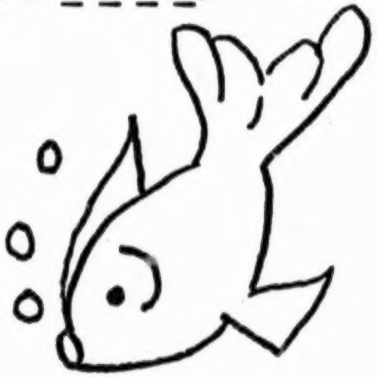
I have feathers.

I am a ____.



I have scales.

I am a ____.



WORKSHEET #3

Dog License
Application

Name: ______________________________

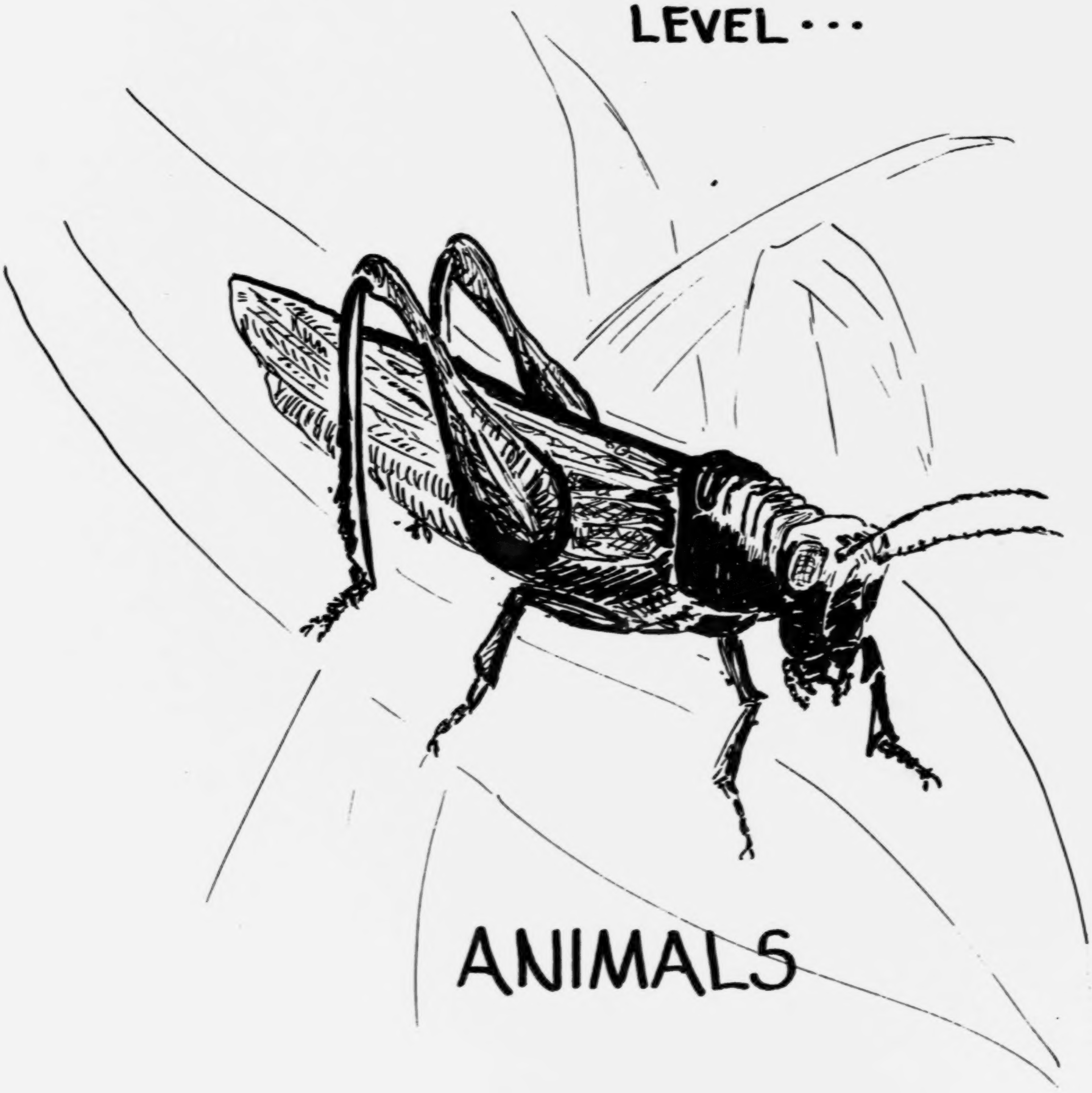
Address: ______________________________

Telephone Number: ______________________

Pet's Name: ______________________________

WORKSHEET #4

INTERMEDIATE LEVEL . . .



ANIMALS

Intermediate Level

STUDY OF ANIMALS

Animal study on the intermediate level, as on the primary, continues to focus on the use of highly motivating subject matter to promote various types of learning. Awareness of characteristics of living things, the interdependence of living things, sensory and perceptual experiences, and experiences in responsibility may be emphasized and reinforced through this area of science.

A listing of specific material to be presented during the teaching of units on animals should contain suggestions similar to the following: How Animals Help Man, How Animals Protect Themselves, Birds, Insects, Reptiles, Fish, Amphibians, and Mammals.

General Objectives
For the Study of Animals

Intermediate Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:
    A. Animals as both useful and harmful to man
    B. Conservation as related to animal life
    C. Simple differences among animal groups
    D. Habits of migration and hibernation
II. To develop ability in relation to:
    A. Basic habits of conservation as related to animal life
    B. How animals are adapted to their environment
    C. Characteristics which differentiate animal groups
    D. Feeding and care of domestic animals, fish and birds

E. Recognition of animals used for food and clothing

F. Basic preventive habits against harmful animals

G. Vocabulary related to functional learning

III. To develop positive attitudes on the part of students which reflect:

A. An appreciation of animals as beneficial to man

B. An acceptance of responsibility in relation to animals

C. An appreciation of animals as a source of pleasure

D. Further understanding of the characteristics of living things

Activities
In the Study of Animals

Initiatory:

1. Pictures of animals in their natural habitat
2. Use of incident involving pet or animal to stimulate
3. Purchase and organization of class aquarium or pet
4. News story with animal subject to motivate questions and interest

Assimilating:

1. Field trips to pet store, farm, exploratory walks for observation of common birds, animals, insects, hatchery, pond, and zoo
2. Speakers such as game warden or Conservation officer, and Officer of Humane Society
3. Bulletin boards
    a. Pictures of animals in hibernation, migration, and natural habitat (include different environments)
    b. Illustrations of different animal groups
    c. Conservation habits as related to animal life
    d. Baby animals that do not look like their parents at birth
4. Related individual and group activities

a. Seatwork exercises for reinforcement of learning related to grouping, conservation, identification, and uses

b. Experience charts recording learning experiences

c. Sensory and perceptual experiences in relation to animal characteristics and differences

d. Animal stories to be read by class and to class by teacher

e. Experiments with hatching eggs

f. Discussion of observations

g. Care of classroom pet(s)

h. Project of bird feeding near classroom, if possible

i. Observation of metamorphosis of a moth or butterly

j. Display of materials (fabrics) which come from animals

k. Student booklet on animals from which man gets foods

l. Place cut-outs of animals into proper environment represented by background scene on bulletin board or flannel board

Culminating:

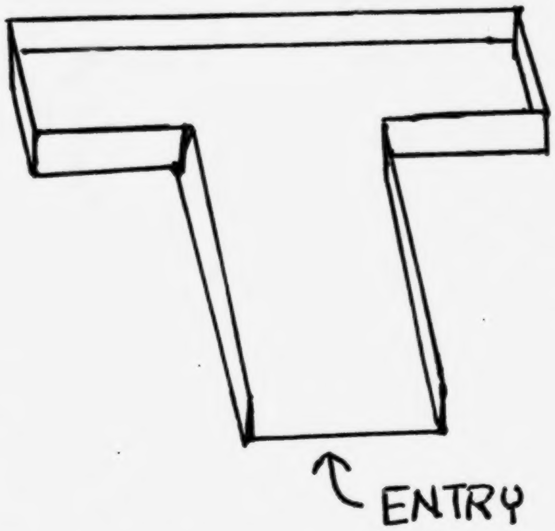
1. Build a bird or animal shelter where food is deposited and class may observe animals, insects, birds
2. Construct an inexpensive aquarium, using a wide-mouth gallon jar, aquarium gravel (or small pebbles collected by students), water plants (elodea, hornwort, or common river plants), snails and goldfish, guppies or river minnows. Experiment to see how much to feed the fish and where to set them to get enough light

SAMPLE EXPERIMENT WITH ANIMALS - INTERMEDIATE LEVEL

Objective: To observe animal reactions to the environment.

Experiment: Purchase mealworms (not a worm, but larval stage of a grain beetle) from a pet or aquarium shop.

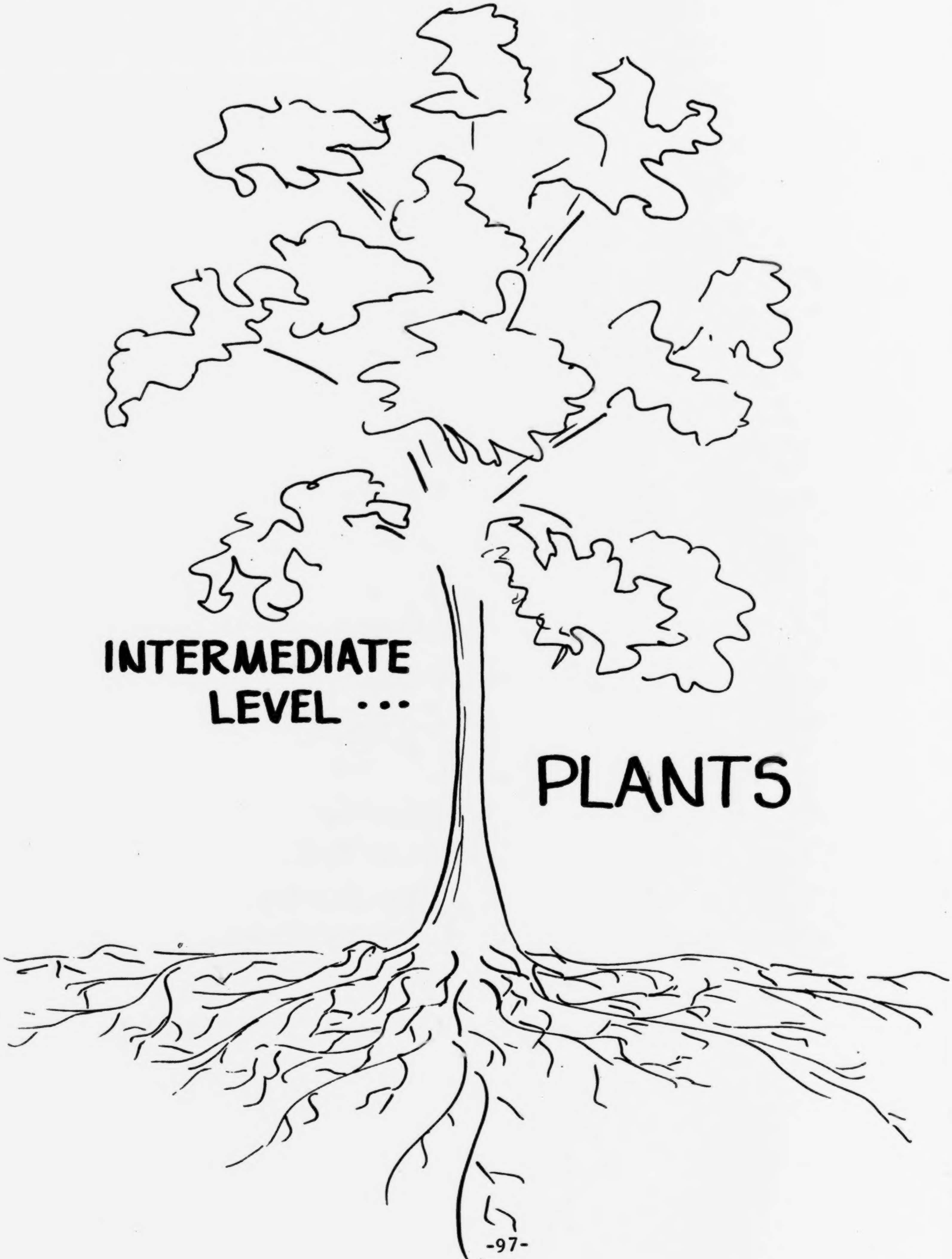
Make a T-shaped tube from oaktag or cardboard:



The mealworm is put into the entry to the tube. When it comes to the end of the chute it has a choice of which way to go. Different conditions may be set up at each end, such as different foods, light or dark, cold or warm. The student may record how many times the worms go each way and decide which they prefer.

(This may also be done with other harmless insects such as box elder bug).

Note: Mealworms are kept in a container with bran or some other cereal, a few crusts of bread, small piece of apple, and crumpled paper. Left undisturbed, they will go through their entire life cycle.



INTERMEDIATE LEVEL ...

PLANTS

Intermediate Level

STUDY OF PLANTS

At the intermediate level, children should learn to distinguish between kinds of plants, should receive concrete learnings for establishment of the concept of plants as useful to man, and be provided experiences with growing plants. The importance of conservation should they be emphasized at this level.

A listing of specific material to be presented during the teaching of units on plants should contain suggestions similar to the following: Trees and Shrubs, Flowers, Seeds, Vegetables and Other Plants We Eat, and How to Care for Plants.

General Objectives For the Study of Plants

Intermediate Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:

   A. The general needs for plant growth

   B. The importance of conservation of plant life

   C. The varieties and general uses of plant life

   D. The fact that plants may grow from different beginnings (seed, root, stem, slip, bulb)

II. To develop ability in relation to:

   A. Raising plants

   B. Recognizing different forms of plant life

   C. Habits of conservation related to plant life

   D. Functional vocabulary related to plant life and use

E. Recognition that some plants are edible in their natural state; others need processing

F. Plants as providing shelter and food for animals

G. Beauty provided by plants

H. The fact that all seed-bearing plants have flowers

III. To develop positive attitudes on the part of students which reflect:

A. A positive feeling for work with plants

B. Respect for conservation habits

C. An appreciation of plants as necessary for survival of life

Activities
In the Study of Plants

Initiatory:

1. Take a nature walk to observe and record information about plants
2. Provide a variety of plants in the classroom
3. Spring garden projec
4. Bulletin board display posing the question of how a plant grows
5. Display labeled parts of actual plants

Assimilating:

1. Field trips such as exploratory nature walks to woods, parks, residential areas, greenhouse, garden, or vegetable market
2. Speakers such as farmer or gardener, soil conservationist, or florist
3. Bulletin boards
    a. Pictures of a variety of trees, names of tree parts, and uses for trees
    b. Illustrations of shrubs, weeds, flowers, and varied types of plant life with examples of their functions

    c. Plants we eat; as they grow and as they are eaten
    d. Collection of seeds contributed by class members
    e. How to care for a lawn
    f. Harmful plants (poison ivy, sumac, briars, etc.)
    g. Illustrations of land and water plants

4. Related individual and group activities
    a. Experiments with varied plants and effects of soil, light, air, and water
    b. Experience charts for recording observation, data and experiments
    c. Seatwork related to classification of plants (i.e., distinction between illustrated weeds and flowers, plants which are eaten or not eaten, plants used for fabrics, evergreen trees and those which shed leaves, etc.)
    d. Display table with a collection of plant parts
    e. Arrange flowers and plants as regular class display
    f. Discuss experiences with plant life
    g. Read stories and write experiments (according to individual levels)
    h. Discuss foods eaten by children and where they originated
    i. Make conservation posters for school display
    j. Discuss ways in which weeds may be harmful. Learn to identify poisonous plants
    k. Dramatize a story about a seed as a "hitchhiker" on clothing of passing child. (Study how seeds travel)
    l. Observe animals gathering food and finding shelter in plant life

Culminating:

1. Flower or vegetable garden
2. Review experience charts

SAMPLE EXPERIMENTS ON PLANTS - INTERMEDIATE LEVEL

Objective: To learn how water gets up to the leaves of plants

Experiment: Put a fresh stalk of celery in a beaker of water which is colored with red ink. Observe how the ink moves up the tubes of the stem into the leaves by means of capillary action.

Objective: To show through experiments that plants cannot live without sunlight, air, or water

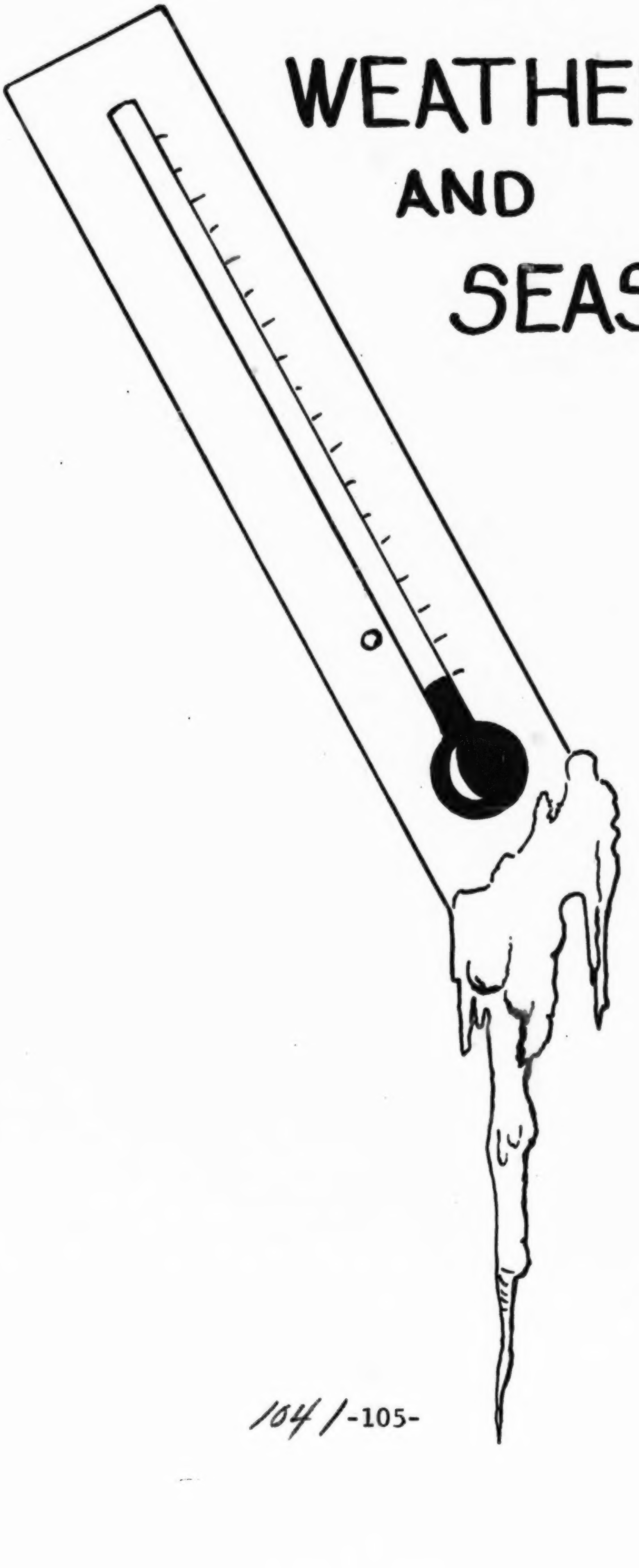
Experiment: Some plants require less water than others. Some do well in the shade, but it is generally true that plants require all three to survive. Place a potted plant in a dark closet and a similar one in a sunny spot (preferably lima bean plant). Examine them each day. The plant will not live long in the dark. It will grow too fast and lose its color. Plants cannot produce food without sunlight. On a bright day plants often make more food than they need. This surplus food is stored in the roots or other parts of the plant until needed.

Experiment: Place two potted plants in a sunny spot. Water only one of them. The other will soon die.

Experiment: Soak three bean or pea seeds overnight in water. Place one of the seeds on moist cotton in a flat dish and keep the bottom moist. Place one in a dish without water. Place the third in a full test tube of water and cork it tight. Keep all three containers in a warm light place. The seed in the dish with moist cotton will sprout and grow because plants do need air and water. The seed alone in a dish had air and sunshine, but not water. The seed in the test tube had water and sunshine, but no air.

INTERMEDIATE LEVEL...

WEATHER AND SEASONS



Intermediate Level

STUDY OF WEATHER AND SEASONS

The content in this study on the intermediate level will be similar to that of the primary level. However, the teacher should review and reinforce the concept taught at the primary level. Forecasting weather for purposes of being prepared in advance should be stressed at this level. Students should form a conscious awareness of the daily effect of weather upon their lives. They should be able to speak of the different seasons with understanding of sequence and the conditions involved. They should become alert to considerations of the effect of weather on planning and in solving life problems, where applicable.

A listing of specific material to be presented during the teaching of units on weather and seasons should contain suggestions similar to the following: Seasonal Change in Weather, How Man Adapts to Weather Changes, The Weather Report, Precipitation, and Dressing for the Weather.

General Objectives
For the Study of Weather and Seasons

Intermediate Level

I. To develop the ability to respond in social conversation or to identify through sensory experiences:

   A. Changes in weather as caused by heat from the sun, by air, and by water

   B. The fact that certain temperatures may be expected at each season

   C. The fact that temperature constantly rises and falls

   D. Temperature changing during the day

   E. The fact that the sun does not heat all parts of the earth evenly

   F. Wind as the movement of air

G. Basic concepts of cloud formations

H. Basic concepts of weather forecasting

I. Different types of precipitation

J. Reasons for dress appropriate for weather

II. To develop ability in relation to:

A. Reading a thermometer

B. Preparing for seasonal changes

C. Recognizing atmospheric conditions

D. Causes of different types of precipitation (i.e., rain occurs in warmer weather, snow and sleet in colder)

E. Keeping weather records

F. Specific characteristics of seasonal weather

G. Basic concepts of the effects of air pressure upon weather

H. Dressing appropriately for the weather

I. Interpretation of simple weather forecasts

J. The effect of weather upon plant and animal life

K. Recognizing that weather does not always follow a definite pattern and may often be unpredictable

III. To develop positive attitudes on the part of students which reflect:

A. A growing interest in, and habits of, weather observation and understanding

B. An appreciation of man's ability to predict weather and in many cases, alter the effects

C. A deeper appreciation of the effect of weather upon man's activity

Activities
In the Study of Weather and Seasons

Initiatory:

1. Daily assimilation of weather reports from local newspaper, radio, and television
2. Display of pictures representing effects of weather conditions (negative and positive representations such as tornado, wind, rain, snow damage, and garden or farm fields with high quality growth)
3. Discussion of current, local weather conditions and effect upon members of class

Assimilating:

1. Field trips to weather bureau, television station, or an exploratory walk for observation of weather conditions and indications of weather's effect upon earth, man-made structures, animals, etc.
2. Speakers such as weather analyst or radio-t.v. reporter
3. Bulletin boards
    a. Illustrations of weather effects for anticipating certain types of weather
    b. Detailed description of reading an outdoor thermometer
    c. Four seasons theme: illustrate play activities, appropriate dress, types of weather, and plant life
    d. Weather charts developed by class
4. Related individual and group activities
    a. Keep a classroom chart to record daily weather changes
    b. Have daily oral interpretation of weather chart by different students

c. Make illustrations of dress appropriate for various weather conditions

d. Use experiments to show effects of sun, air, and water

e. Class experiences in reading and comparing thermometer data

f. Consider weather conditions when planning class trips or picnics

g. Read stories telling how animals protect themselves during seasonal changes

h. Observe clouds, draw pictures of cloud formations and discuss using clouds for weather indicators

i. Make oral and written reports on characteristics of specific seasons

Culminating:

1. Dramatize a radio or television program, incorporating other current studies. Include a weather report to comment on local weather for the day and comparison with class weather record for previous month
2. Make a mural representing the four seasons with poster-type explanations for indicated effects of weather on land, man, and animals

SAMPLE EXPERIMENTS ON WEATHER AND SEASONS - INTERMEDIATE LEVEL

Objective: To show how fog occurs

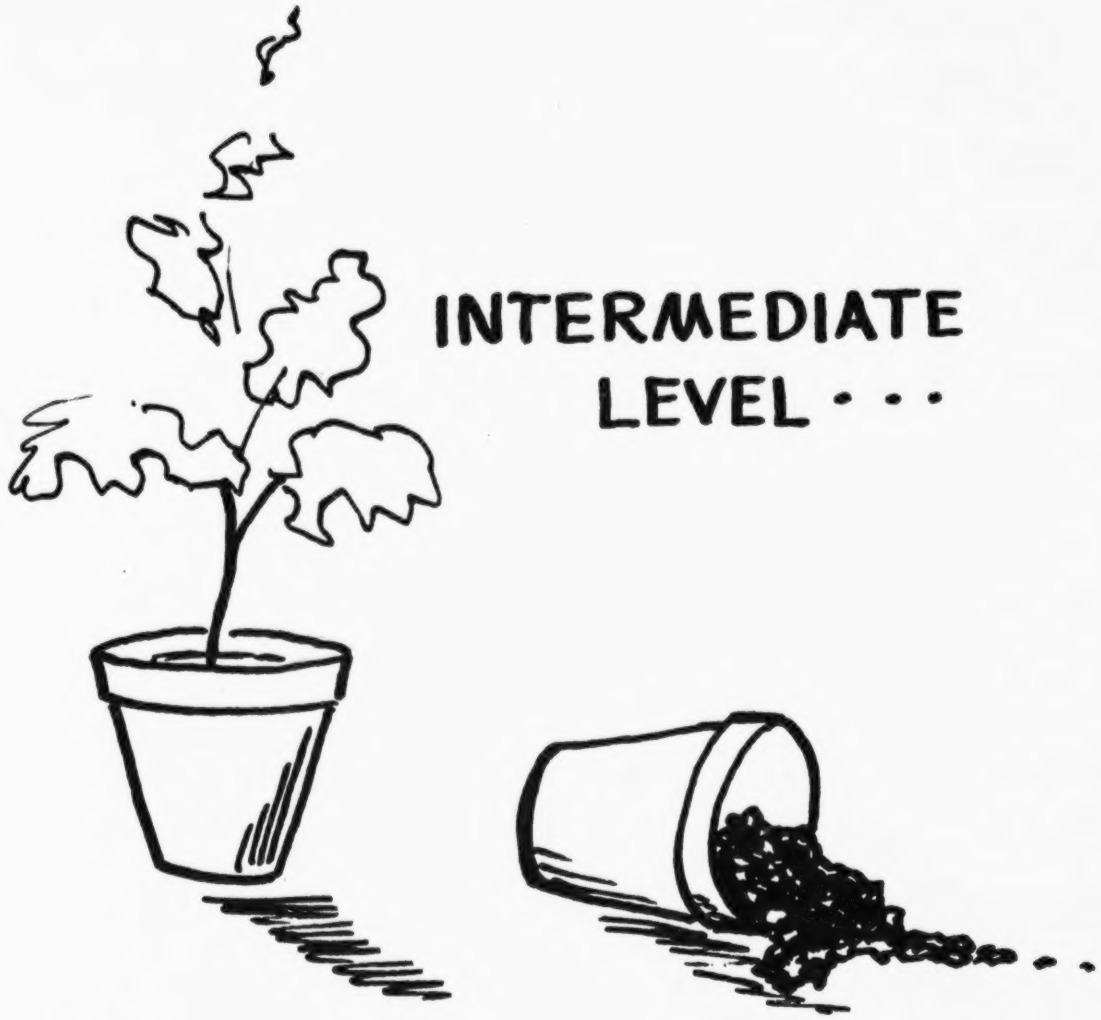
Experiment: Fill two quart milk bottles, one with a cup of hot water and the other with a cup of cold water. Place an ice cube on the openings of each and observe that the fog (water vapor) forms in the one with hot water and not the other. Point out that fog forms when a warm moist mass of air blows over a cool surface of land or water.

Objective: To show how a cloud is formed

Experiment: (Allow various students to experiment). Fill a beaker with cracked ice and hold it under your mouth. Exhale slowly across the top of the beaker and you will see your breath form a cloud. (Students will possibly remark on this occurring when one is outside in very cold weather). The cold from the ice condensed the vapor in your breath, changing it to very fine droplets of water. This is the way clouds form. When the droplets become large enough they fall as rain. If they pass through very cold air, they will fall as snow flakes.

Objective: To show how rain and snow come from clouds

Experiment: Place ice cubes in a shiny condensed milk can and fill it approximately half full with cold water. Be careful not to get any water on the outside of the can. Watch the outside of the can closely and explain any change. Remind students they have learned from previous experiments that air contains moisture. As the air is cooled the water vapor condenses or changes to a liquid which can be seen on the outside of the can. As air is cooled the moisture in it condenses into small droplets which form clouds.



INTERMEDIATE LEVEL . . .

EARTH AND EARTH COMPONENTS

Intermediate Level

STUDY OF EARTH AND EARTH COMPONENTS

While the educable mentally retarded student will not use extensive knowledge about the earth he should have basic, general facts for ease of comprehension and social interaction. Beyond this, he needs a working knowledge of how man may use water, soil, rock and air to help him in daily activities. The basic concepts presented in the primary section should be reviewed and reinforced.

A listing of specific material to be presented during the teaching of units on earth and earth components should contain suggestions similar to the following: How Man Uses Land, Water: Necessary for Life, Air is Real, and Earth in the Solar System.

General Objectives
For the Study of Earth and Earth Components

Intermediate Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:

   A. Primary level objectives for review

   B. Conservation as a practice of preserving the earth for man's use

II. To develop ability in relation to:

   A. Caring for land to preserve and use it for the best functions

   B. Conservation of water resources

   C. Recognition of the importance of air to life

   D. Recognition of different types of earth surfaces

   E. Functional vocabulary related to study of earth

III. To develop positive attitudes on the part of students which reflect:

- A. An appreciation of the necessity of conservation practices
- B. An awareness of constant change in earth surfaces

Activities
In the Study of Earth and Earth Components

Initiatory:

1. Display of world globe
2. Bulletin board display showing need for conservation
3. Field trip observations of soil, rock and water

Assimilating:

1. Field trips to a rock quarry or exploratory walks
2. Speakers such as soil and water conservationists and a science specialist to discuss earth in the solar system
3. Bulletin boards
    - a. Illustrations of results of lack of soil and water conservation
    - b. Illustrations of various earth surfaces
    - c. Examples of man's use of soil, rock and water
    - d. Illustrations of various earth surfaces
    - e. Illustration of effects of varied degrees of wind (i.e., breeze, wind, tornado)
4. Related individual and group activities
    - a. Use experience charts to record observations and learning about the earth
    - b. Observation of rock formations, erosion, cut timber, stream bed

c. Discussion of how the earth changes, signs of this and how man may use this to his advantage

d. Observe and discuss man's interference with land (conservation). Pictures of burned or leveled forest, erosion, housing projects, litter on beaches, etc., might be employed

e. Seatwork related to practices of conservation, differences in earth surfaces, and size concepts of Earth

f. Discuss ways in which class members may practice conservation

g. Use class globe to become familiar with representations of varied earth surfaces

h. Color in map of earth's surfaces

i. Look at map of solar system to see Earth in relation to sun, moon, etc.

Culminating:

1. Make booklet of conservation practices
2. Review experience charts

SAMPLE EXPERIMENTS ON THE EARTH AND EARTH COMPONENTS - INTERMEDIATE LEVEL

Objective: To demonstrate how forces of nature build up earth in some places and wear it down in others

Experiment: Fill a box half full of dry soil. Turn on an electric fan and hold it over box. Sprinkle water over the surface. Turn on the fan again and compare results. Repeat the activity using dry sand in another box.

Objective: To show how ground cover will slow soil erosion.

Experiment: Use the large pan of dry loose soil shaped into a hill. Cover soil with a piece of sod or with leaves, twigs, and other plant materials. Turn the electric fan toward pan of soil. Observe results. Sprinkle hill with water. Discuss the results.

INTERMEDIATE LEVEL . . .

UNIVERSE

Intermediate Level

STUDY OF THE UNIVERSE

The basic goals of developing awareness and learning from observations should be continued from the primary level. The teaching of functional information related to realistic life experiences, such as the occurrence of day and night, the actual form of stars, the use of the sun for heat and light, and why there is current emphasis on space travel and study, should be stressed at this level.

A listing of specific material to be presented during the teaching of units on the universe should contain suggestions similar to the following: Relationship of the Earth, Sun, and Moon, The Solar System, and Rockets and Satellites.

General Objectives
For the Study of the Universe

Intermediate Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:
   - A. Space beyond the earth containing sun, moon and stars
   - B. Relative size of sun and moon
   - C. Related movement of sun, moon and earth
   - D. Man's use of light and heat from the sun
   - E. The causes of day and night
   - F. Man's interest in space

II. To develop ability in relation to:
   - A. Observing natural phenomena for reinforcement of learning
   - B. Basic vocabulary related to life experiences effected by the universe

C. Wise use of sunlight and heat

D. Estimating size in relation to distance

E. Basic information on current space programs

F. Distinguishing between a rocket and a satellite

III. To develop positive attitudes on the part of students which reflect:

A. An appreciation of the relationship between the earth and the sun and moon

B. An appreciation of beauty as provided by the universe

Activities
In the Study of the Universe

Initiatory:

1. Use of current news of space program to stimulate interest
2. Bulletin board displays of the moon, the sun, path of moon and sun around earth
3. Discussion of weather to initiate curiosity and interest in the sun

Assimilating:

1. Field trips for outdoor observations of effects of sunlight and planetarium or telescope (if night trip is possible)
2. Speakers such as a person with hobby of star observations or science specialists
3. Bulletin boards
    a. Solar system
    b. Eclipses of moon and sun
    c. Accounts of space shots
4. Related individual and group experiences

a. Experiments showing movement of sun and heat produced
b. Experiences in comparing different sized objects for concepts of sizes of parts of the universe
c. Experience chart accounts to study of the universe
d. Observations of length of daylight from one season to another
e. Draw pictures of constellations and label with common names (encourage students to observe night sky for identification of most recognizable constellations)
f. Use flashlight to demonstrate how light diminishes as it moves farther away

Culminating:

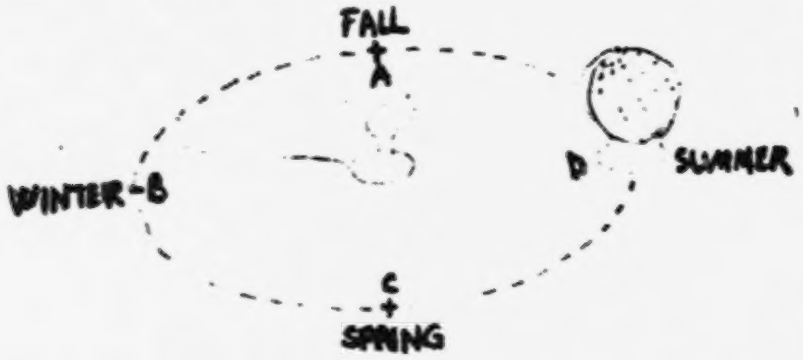
1. Review experience charts

SAMPLE EXPERIMENTS ON THE UNIVERSE - INTERMEDIATE LEVEL

Note: Experiments listed for Primary Level may be reviewed. If any students recall experiments, allow them to demonstrate for class.

Objective: To show that dark colors absorb light energy (heat from the sun) more than light colors.

Experiment: Use a piece of black cloth and a piece of white cloth to wrap around separate thermometer bulbs. Record the temperature of each in ten minutes.



Objective: To show the cause of the seasons

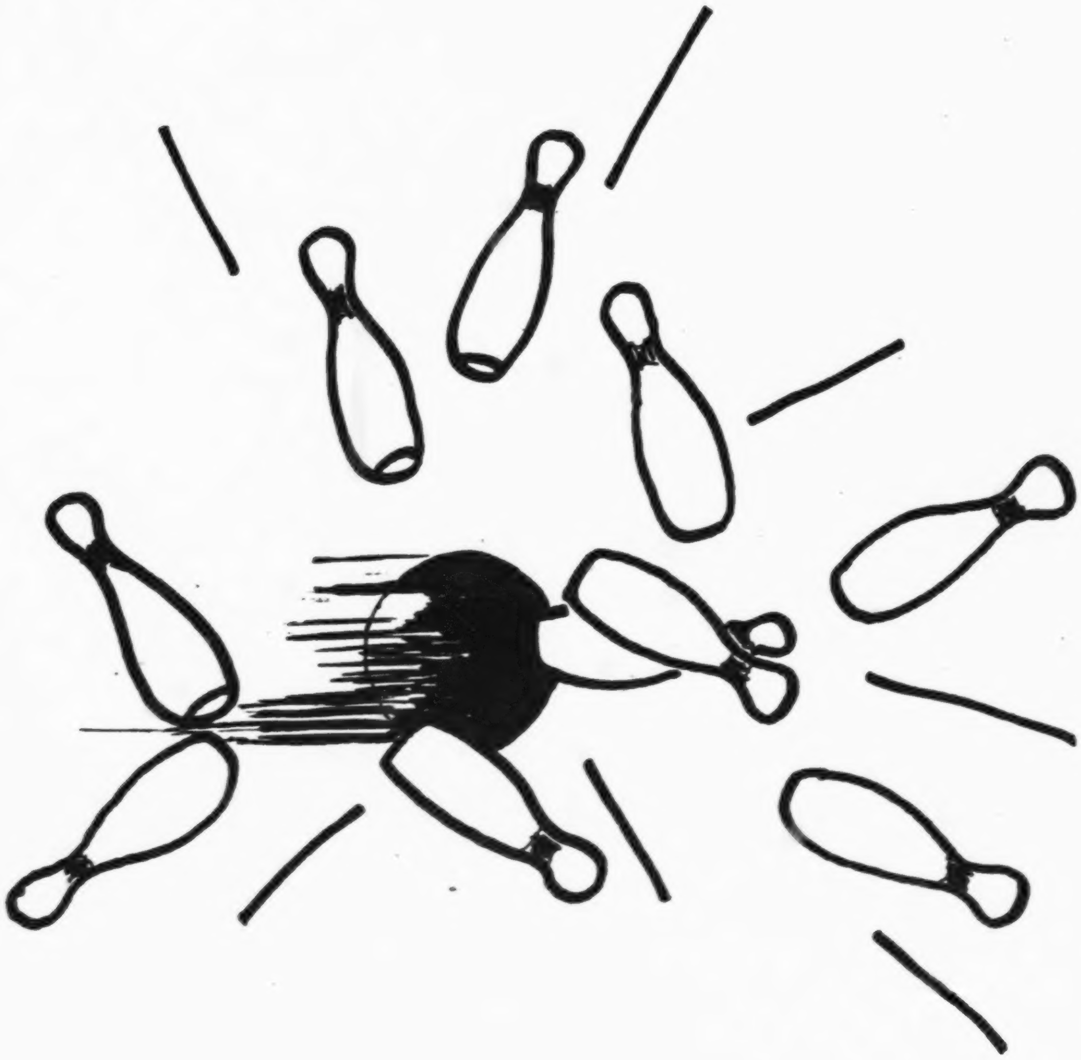
Experiment: Set an electric lamp on the floor at the front of the room and mark a four-foot diameter circle around it with chalk. Place the globe on the floor directly on the circle with the axis tilting directly toward the lamp which represents the sun. Turn out all other lights and draw the shades.

(a) When the axis is tilting toward the sun it is June 21 and the sun's rays are more direct, causing our summer in the northern hemisphere while the southern hemisphere is having winter.

(b) Move the globe around the lamp in a counter-clockwise direction. When you reach point A in the diagram it is now September 22 and our fall season begins. Point out that the sun's rays are now shining directly on the equator and that the heat of the sun is equal in the northern and southern hemispheres.

(c) Continue to move the globe in the same direction to point B in the diagram. It is now December 21 and the sun is at its greatest distance from the northern hemisphere and the sun's rays are less direct. This makes it colder and consequently, we have our winter while the southern hemisphere is having its summer.

(d) When you move the globe to point C in the diagram it is March 21 and the sun's rays are hitting the earth at the same angle as they were in the position (b) and the same general temperature conditions exist. We call this period of the year spring. It takes approximately 365 days for the earth to travel once around the sun.



INTERMEDIATE LEVEL…

FORCES

Intermediate Level

STUDY OF FORCES

Study of forces at the intermediate level will add the concept of gravity to the subject areas covered on the previous level. The opportunity for functional teaching is extensive in these subject areas. They correlate highly with experiences in the home and will relate to later vocational situations. For these reasons, highly motivational activities should be provided and a variety of teaching approaches employed. Although it is suggested that specific units be taught along the study of forces, a teacher should find many opportunities for reinforcement of desired objectives through incidental learning and through Life Experience Units or other topics.

A listing of specific material to be presented during the teaching of units on forces should contain suggestions similar to the following: Electricity, Using Sound to Help Us, Simple Machines, Telephone, Tools, Magnetism, and Gravity.

General Objectives
For the Study of Forces

Intermediate Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:

   A. The fact that sound travels from one place to another

   B. The fact that sound is used to a great extent by man

   C. The fact that there are several causes for fire and heat

   D. Heat used for many purposes

   E. How electricity is used to help man

    F. Gravity as a force which holds things down
    G. Responsibility and value attached to experience with machines
    H. Different types of machines
    I. How friction operates as a force

II. To develop ability in relation to:

    A. Using forces to accomplish work in a more efficient manner
    B. Safety in relation to fire and electricity
    C. Using sound for more awareness of environment
    D. Care and basic skill in handling tools and simple machinery
    E. Vocabulary related to study of forces

III. To develop positive attitudes on the part of students which reflect:

    A. An acceptance of force as a necessary part of work and play
    B. An appreciation of the importance of safety in relation to forces
    C. An appreciation of machines as useful to man and worthy of care

Activities
In the Study of Forces

Initiatory:

1. Display of sound and communication equipment
2. Bulletin board representation of historical account of man's use of fire
3. Display of magnets
4. Fire Prevention Week preparation
5. Discussion of sounds
6. Display of simple machines

Assimilating:

1. Field trips or exploratory walks for observation of sound (cars, planes, animals, wind), machinery, and use of heat

2. Speaker such as fireman to give functional talk on how fire, water, and machines affect his and students' lives
3. Bulletin boards
    a. Fire safety
    b. Safety with electrical outlets and appliances
    c. Examples of uses of electricity
    d. Examples of kinds of heat (i.e., sun, gas, electric, coal, etc.
    e. Pictures of machines
    f. Pictures of different types of magnets
    g. Posters on telephone communication
4. Related individual and group activities
    a. Experience chart accounts of observations, discussion and experimentation
    b. Seatwork related to effect and use of forces
    c. Experiments to show the travel of sound
    d. Experiments with magnets
    e. Charts of safety factors related to fire and electricity for use in students' homes
    f. Telephone usage
    g. Projects using tools, simple machines with stress on safety and proper care
    h. Experiments showing force of gravity
    i. Basic study of common machines used in home (vacuum cleaner, sewing machine, lawn mower, power tools, etc.)
    j. Discuss sounds meaningful to students (i.e., siren, fire bell, telephone bell, ice cream man, church bell, etc.)

Culminating:

1. Review experience charts
2. Display of projects made in study of tools

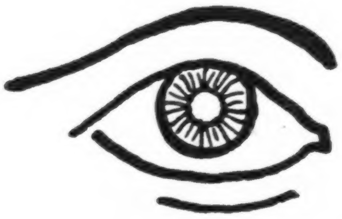
SAMPLE EXPERIMENTS ON FORCES - INTERMEDIATE LEVEL

Objective: To show that sound travels through solids

Experiment: Strike a tuning fork and hold it in the air. Now strike it again and touch the stem to a door panel or a window pane. It seems louder when transmitted by wood or glass.

Objective: To show that fire needs oxygen

Experiment: Acquire a half-pint, a quart and a half-gallon jar. Set up three lighted candles on a table. Have each of three students hold a container and stand in front of a candle. At a given signal have them place their jar over the candle. The candles will go out in the order of the amount of oxygen in the containers.



INTERMEDIATE LEVEL...

HUMAN

Intermediate Level

STUDY OF HUMAN BEINGS

The development of a positive self image is of prime importance to the retarded individual. Basic to the psychological and emotional aspects of this development is understanding and acceptance of the body and its physical relationship to the environment. The mentally retarded need guidance in perceiving this interaction of the human and the physical environment. Practice in cause and effect reasoning is of value in decreasing their specific learning disabilities.

Basic understanding of body functions and parts should be taught for the purposes of establishing proper health and safety habits and the reduction of frustration in life situations dealing with natural phenomena.

A listing of specific material to be presented during the teaching of units on the human should contain suggestions similar to the following: Man as an Animal, Human Needs, The Sense Organs, and Body Systems.

General Objectives
For the Study of Human Beings

Intermediate Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:
  A. How man adapts to his environment
  B. The human body containing various systems to help it to function
  C. Man's dependency upon certain factors of his environment
  D. Human needs for existence
  E. Man's intelligence distinguishing him from other animals

II. To develop ability in relation to:

    A. Establishing habits for most effective adaptation to environmental conditions
    B. Good health habits
    C. Recognition of some signs of ill health
    D. Recognition of environmental conditions requiring adaptation by man
    E. Sensory experiences
    F. Functional vocabulary related to the human body

III. To develop positive attitudes on the part of the students which reflect:

    A. An appreciation of man as distinguished from other forms of life by his intelligence
    B. An appreciation of the necessity of proper body care
    C. An appreciation of both functional and aesthetic properties of the sense organs
    D. An appreciation of man's ability to adapt to a variety of environmental conditions

Activities
In the Study of Human Beings

Initiatory:

1. Bulletin board and poster displays to motivate interest in (1) Man's adaptation to natural environment (2) How man meets his needs for survival (3) Use of sense organs (4) Body Systems (5) Safety habits
2. Discussion of daily activities of individual class members for

comparison of (1) Meeting life situations, or (2) Health habits, or (3) Use of sensory organs

3. News item relating survival of individual(s) in unfavorable situation (extreme cold, floods, snowstorm, tornado, etc.)
4. Socio-drama with situation of unfavorable weather or lack of usual materials for meeting human needs. Direct students to act out what they might do to overcome such a situation

Assimilating:

1. Field trips such as exploratory walks to observe (with teacher guidance) evidence of how man adjusts environment to his needs (buildings for shelter, gardens for food, pipes for carrying water, windows for light and air, clothing for protection, cars for transportation, etc.)
2. Speakers such as school nurse, dentist, and physician
3. Bulletin boards
    a. Note: See suggestions under Initiatory Activities
    b. Posters on sense organs
    c. Illustrations of body uses of food (heat, growth, repair)
    d. Comparative illustrations of adjustments by early man and those of modern man
4. Related individual and group activities
    a. Stories about human adaptation to natural environment
    b. Discussion of man as an animal, with similar needs, less physical strength than some, but superior intelligence which ranks him above others
    c. Experience chart on man as a mammal (list characteristics of:

        - (1) covering of fur or hair
        - (2) mammary or milk glands to provide nourishment for young
    - d. Seatwork on health habits, safety in relation to body parts, use of sensory organs, and ways to adjust in unfavorable situations
    - e. Games utilizing sensory experiences
    - f. Booklet of basic human needs and how they are met (air, food, water, protection from elements)
    - g. Demonstrations on care of hair, skin, teeth, ears, eyes

Culminating:

1. Posters (for display) on "How I Keep My Body Healthy"
2. Essays on pleasant sensory experiences

Starter Unit

Intermediate Level

THE SENSES

By

Dennis Corwin

This unit is written up from actual classroom practices incorporated in the science program for the Pine School of the University of Iowa.

I. SELECTION OF UNIT: THE SENSES

Children use their senses every day to find out about the world around them. The mentally retarded child must rely heavily upon the senses for information about his environment. However, the ability to use the senses discriminately is often not well developed. Use of the senses to perceive the environment accurately is a skill that needs constant guided development. This unit should stimulate a keener awareness of the child's environment, develop a better vocabulary to communicate with others, and improve discriminate use of the senses. Guided sensory experiences should never begin and end with a single unit, but should be incorporated as often as possible into all of the learning experiences of the child.

II. SUB-UNITS

Weather Reporting
Sounds Which Help Us
Money
Plants
Home Safety
Clothing
Sense Organs
Animals

III. GENERAL OBJECTIVES

A. To develop better communication and observation

B. To develop better understanding skills

C. To become more aware of the use of the sense of touch

D. To become more aware of the sense of taste

E. To become more aware of the use of the sense of smell

F. To learn the importance of using as many senses as possible

G. To learn that the senses are limited and can give wrong information

H. To learn that special instruments are used by scientists to improve the use of the senses

IV. CORE AREA ACTIVITIES

A. Arithmetic Activities
  1. Counting objects
  2. Estimating numbers of objects in a box
  3. Count time periods in games
  4. Recognizing specific coins
  5. Compare sizes
  6. Add number of objects passed out to class
  7. Use calendar and thermometer for keeping weather account
  8. Measure sugar for making Kool-Aid
  9. Measure teaspoon of jam
  10. Distinguish between few and many (i.e., grains) when experimenting with solids
  11. Use pan balance
  12. Distinguish between coins used in experiments

B. Social Competency Activities
  1. Ask and answer questions
  2. Observe external stimuli more closely
  3. Use senses more often and more accurately
  4. Take turns in class activities
  5. Distinguish right and left

C. Communicative Skills Activities

1. Write experience charts
2. Read posters, charts, books on use of senses
3. Ask and answer questions
4. Learn to describe objects accurately
5. Dramatize a short story
6. Make a bulletin board display
7. Match descriptive words with objects
8. Learn directions
9. Write accounts of sensory experiences
10. List and name purposes of sense organs
11. Give oral reports on experiences with senses
12. Distinguish between ease of reading small letters and large letters
13. Discuss care of the sense organs
14. Keep weather record

D. Safety Activities

1. Practice in observing for objects or exit routes for use in emergency situations
2. On field trip, pick up harmful objects which may clutter school yard
3. Learn caution and proper method for handling sharp-pointed objects
4. List or draw pictures of objects which may be dangerous to touch

5. Discuss and draw illustrations of dangers of tasting unknown substances
6. Use experiments to learn to recognize odors which might signify danger, such as fire
7. Display and learn to recognize symbol for poisonous substances
8. Use caution in mixing chemicals which might be harmful
9. Observe visual distortions possible under water for safety in diving and swimming
10. Practice habits of using vision for safety in bicycle riding
11. Learn and practice safety habits for protection of the sense organs

E. Health Activities

1. Discuss and draw pictures of proper dress for varied types of weather
2. Learn to recognize liquids and solids which might be harmful to the health if swallowed
3. Discuss good health habits related to the sensory and nervous systems

F. Vocational Activities

1. Relate development of more accurate use of sensory organs to manipulation of machinery, reflex action, etc., important to vocational competency
2. Practice following directions
3. Point up safety activities in relation to job safety
4. List jobs which require specific use of senses
5. Learn to keep records

V. RESOURCE MATERIALS

Experience Chart - tablet, magic markers, pictures, easel

Bulletin Board

Charts and Posters

Calendar

Thermometer

Tape recorder

Shoe box

Coins

Small objects of varied shape

Small cardboard box

Containers such as plastic refrigerator bowls

Powdered ard granulated substances

Pictures

Pieces of cloth of varied textures

Salt, sugar, vinegar, coffee, rubbing alcohol, lye

Toothpicks

Water glasses

Coins

Orange juice cans

Fruits and vegetables, vanilla, Kool-Aid, jam

Magnifying glass

Microscope

Styrofoam block

Steel ball

Pan balance

Films

VI. VOCABULARY

what
which
smell
taste

touch
feel
hear
fingers

eyes
ears
nose
mouth

rough
smooth
liquid
solid

poison
danger
right
left

summer
winter
autumn
spring

tongue
safety
little
wild

tame
sweet
sour

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
A. To develop better communication and observation	1. Ask questions to stimulate an interest in observing such as: Was the sky cloudy or clear? Which way was the wind blowing? What color is the front door of the building? Without looking, how many windows are there in the classroom? etc.		
	2. Put a group of 10-15 familiar objects under a sheet of newspaper. Explain to the children that they will only be able to look at the objects for a short time, but they are to observe quickly and try to remember as many as they can. Lift the paper for 5 - 10 seconds. Stimulate a competitive spirit and recognize the "champion observer." This can be repeated throughout the unit using different kinds and numbers of objects and different observation times. Look for individual improvement from week to week as a measure of progress.	Objects familiar to the students	
	3. A variation of the game Twenty Questions can be played with a student or team of students selecting a visible object in the room which other students must identify by asking questions having yes or no answers. Recognize good questions on the part of the students and guard against making conclusions too rapidly without having sufficient information. The students should become more precise in describing objects and better at asking the right kinds of questions when they have had more experience with this type of activity.	Objects in the classroom	
	4. Have a small group of students perform a short play without words. Ask questions of the class such as: Who entered the room first? What did		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	Jim take out of his pocket? What color was Jane's dress? Point out to the class that similar problems exist when people observe crimes or accidents.		
	5. Ask students without looking to tell where certain objects are located in the room or school building.		
B. To develop better understanding skills	1. Make a tape recording of sounds in the classroom. Play the tape back to the class and see if they can identify the sound and where it came from. This could also be done with tapes of animal sounds, danger sounds, sounds of machines, etc.	Tape recorder	
	2. Put one or more objects in a closed shoe box. Have students shake the box. Describe the sound. Can you tell what shape the object is. Try more than one object and see if the children can tell how many objects there are in the box.	Shoe box Various small objects	
	3. Use a penny or nickel, dime and quarter. Do not let the children see while you drop one. See if they can tell by the sound of the impact which one is dropped.		
C. To become more aware of the use of the sense of touch	1. Use an "Object Box" or "Mr. Touch" box. Put objects in a container such as a shoe box with a hole in one end just large enough for the students to get their hands in. The hole can be covered with a cloth flap. Have the students put their hand in and try to identify the object by touch. Sandpaper, velvet, rubber, leather, ice cubes, orange, apple are interesting things to put in the box.	Small cardboard box	

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
	2. Put samples of powdered and granulated matter in containers which are unmarked and a similar set of samples in containers which are marked. Blindfold the students and have them try to match the samples: Use as many descriptive words as possible to describe the differences in feeling of the different substances. Sugar, salt and flour are three good substances to use.	Containers, powdered and granulated material	
	3. Take a field trip around the school yard. Collect such things as bark, stones, twigs, leaves, grass, etc. Make a bulletin board display with the objects grouped according to similarities and differences of feeling. The class could also try to match descriptive words, printed on cards, with the objects.	Bulletin board Descriptive words printed on cards.	
	4. Have a student put his arm out to one side so that he can't see it. Don't move the arm or hand at all. Ask him to describe his arm by answering these questions: a. Is the arm straight out, slanted or bent? b. Which direction? c. Which direction is your hand pointed? d. Is your palm facing up or down? e. Are your fingers straight or bent?		
	5. Have the students gently press the point of a pencil onto their fingertips. After they have done this a few times, have them turn the pencil around and press the finger with the eraser end. Describe the differences in feeling. Blindfold students and see if they can tell the difference between a sharp pencil point touching the fingertips lightly and a		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	blunt eraser touching it lightly.		
	6. Have pictures of things that might be dangerous to touch, such as a radiator, fan, oven burners, etc. Discuss dangers and reasons for them. The pictures could be used as a bulletin board display.	Pictures of dangerous things to touch Bulletin board	
	7. Give the students pieces of cloth of various textures. Describe the difference in touch. Discuss which would feel best to wear. Which would be best to wear in summer, in winter?	Pieces of cloth of various texture	
D. To become more aware of the sense of taste	1. Have some salt, sugar, vinegar, and instant coffee, some toothpicks and two glasses of water. Wet the toothpick and apply one of the materials to one spot on the tongue and then to others (tip, sides, back). Give students a drink of water each time to clear the taste buds.	Salt, sugar, vinegar, coffee, toothpicks and water	
	2. Discuss dangers of tasting unknown materials. Harmful materials in the home such as medicines, cleaning compounds, etc. Dangers outdoors, berries, plants, etc.		
E. To become more aware of the use of the sense of smell	1. If there is a cafeteria in the school, have the students smell and try to decide what is being served for dinner.		
	2. Make some different odors in the room out of the children's sight and see if they can identify them (burning bread or rubber, ammonia, vinegar, pine needles). Relate this activity to using the sense of smell for safety. (Detecting fire, harmful materials to taste, etc.)		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	3. Put water, rubbing alcohol, and white vinegar in three glasses. Ask the children what they think is in the glasses. Let them smell each. Relate to dangers of tasting anything without knowing what it is even though it looks safe.	Glasses, water, white vinegar, rubbing alcohol	
	4. Put something such as an orange peeling in a cardboard box with a few small holes in it. Have the students see if they can identify the contents by just smelling. Use other things, such as onion peelings.	Cardboard box	
F. To learn the importance of using as many senses as possible	1. Pass out some objects, one to each small group of children. Have them use all of their senses to observe the object. Have different students describe their object and see if the others can figure out what it is.		
	2. Give each student a pile of salt, sugar, and starch. Describe the visual appearance, feel, sound when rubbed on paper, odor and taste. Caution against tasting or touching without knowing for certain that it is safe. Use some granulated lye, mix with some water in a glass container. Let the children feel the container, it should get hot.	Salt, sugar, flour, and lye	
	3. Have the children describe the weather conditions each day using as many senses as they can.		
	4. Make a bulletin board with large cutouts of the body that are used to sense, show how they are used.	Bulletin boards, cutouts of the senses	

3

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
G. To learn that the senses are limited and can give wrong information	1. Put a coin in the bottom of an empty coffee cup. Have the viewer stand so that he cannot see the coin. Slowly pour in water and the coin comes into view.	Coin, cup, water	
	2. Put a pencil in a glass of water. The pencil appears to be in two parts as the water bends the light. Relate to dangers in diving, when swimming, an object under water may not be in the exact place it appears to be.	Pencil, glass, water	
	3. Have a student look straight ahead into the eyes of another student. Move an object up behind him at eye level. Ask him to signal when he can see it. Drop the object, marking the spot where it hits the floor. Relate to importance of turning the head and looking in both directions when crossing a street, riding a bicycle, etc.		
	4. Cut the bottoms from two orange juice cans. Have students walk using the tin can "eye-glasses." Have them observe and describe the unusual effects.	Orange juice cans	
	5. Use an adjustable speed phonograph to vary the time available to look at information printed on a small card mounted in a cork on a small motion picture reel. At a given speed is it easier to see large letters than small letters? Does the contrast between the letters and background have an effect? Change the amount of light in the room and the distance between the observers and the letters. Relate the results to reading comfort. Adequate lighting, size of type, color of paper, etc.		
	6. Discuss the purpose and importance of wearing		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
G. To learn that the senses are limited and can give wrong information (Cont'd)	glasses if it is necessary.		
	7. Apply sugar to parts of the tongue other than the tip to show that certain regions of the tongue are only sensitive to certain tastes.	Sugar	
	8. Dry the tip of the tongue and apply sugar. Can you taste the sugar as long as the tongue stays dry?		
	9. Have a child blindfolded and plug his nose. Feed him bits of raw fruit and vegetables. Can he distinguish what he is eating?	Fruits and vegetables	
	10. Blindfold a student and put some vanilla under his nose. Tell him you will take it away and he is to tell you when. This shows how soon the nerves of smell get tired.	Vanilla	
	11. Make some Kool-aid, sweetened to taste. Then eat a teaspoon of jam. Now drink some more Kool-aid. Does it seem as sweet?	Kool-aid, Jam	
	12. Use pictures of wild and tame animals to compare their sense of smell with that of humans	Pictures: "Wild Animals" M.A. Donohue & Co. Amphibians, Reptiles, Mammals, Fish, & Insects SVE Co.	
H. To learn that special instruments used by scientists	1. Using a magnifying glass or low-power microscope study a few crystals of table salt, sugar, and epsom salts. Hair and cloth fibers are also interesting.	Hove, Elizabeth & others A Sourcebook for Elementary Science	
	2. Specific topics which individuals or small groups may wish to investigate include microscopes, telescopes, binoculars, satellites,		

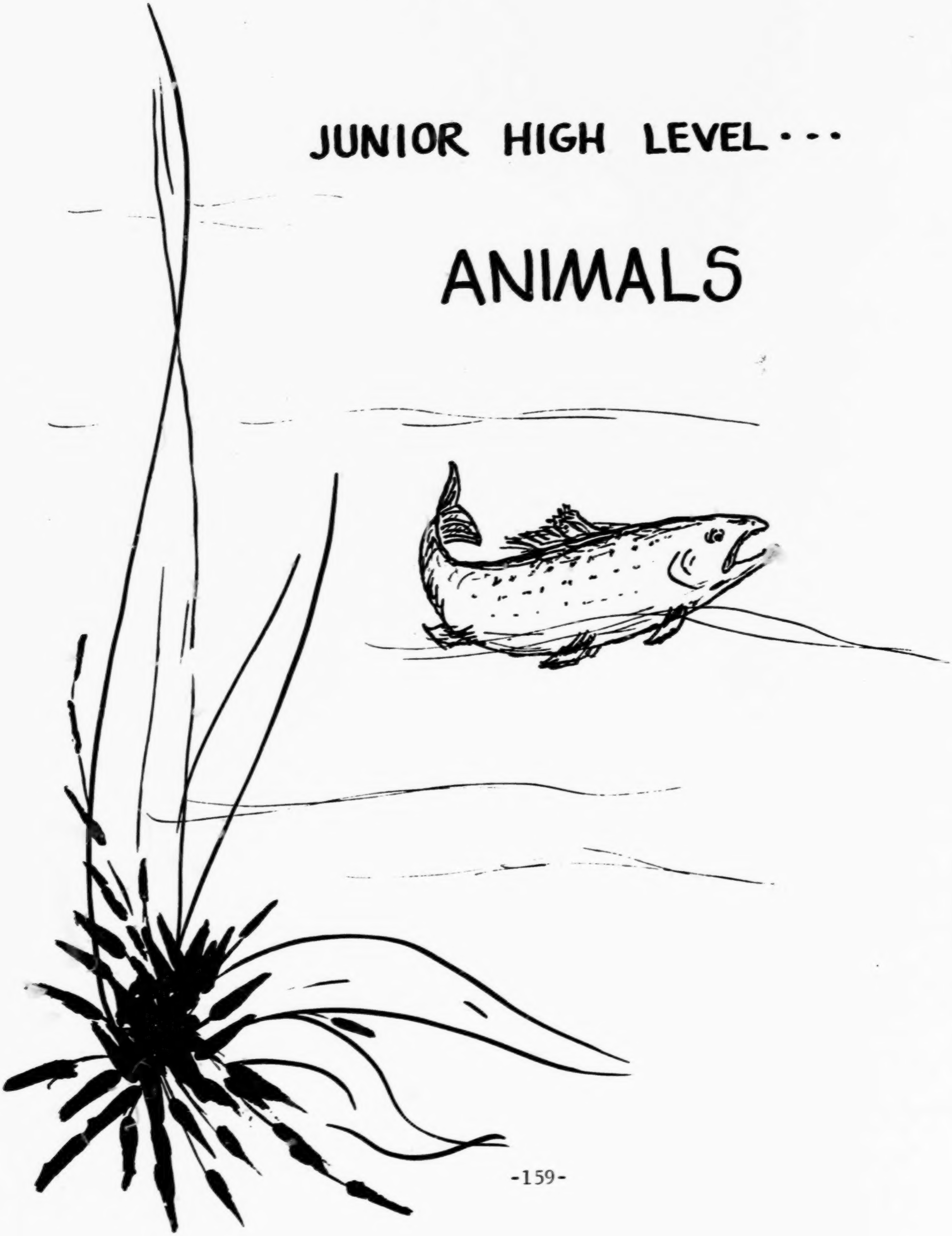
OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
to improve the use of the senses	hearing aids, stethoscopes. 3. Use a styrofoam block and a small steel ball. The steel ball should be a little lighter than the styrofoam block. Have the students compare the weight of each by holding them in the palms of the hands. The steel ball will feel heavier. Check with a simple pan balance.	Magnifying glass Microscope Styrofoam block Steel ball Pan balance	
I. To gain experience in making organized and systematic observations	1. Observing and classifying objects, or observing and identifying objects are examples of systematic observations. Children should not be forced to do regimented, scientific sorting or classifying. A more useful experience permits children to do their own sorting on the basis of their own observations. Children can observe and sort a wide variety of collections - assorted nails, buttons, leaves, marbles, seeds, sea shells, etc. 2. Keeping long term weather records provides a good opportunity for systematic observations.		
	3. Record a sequence of sounds on tape and play it back for the children to observe. Start with two or three sounds, later increase the number to five or more. Ask the children to infer what has happened. Someone could act out the sequence in order: Some samples of sequence might be: (a) Walk to sink, turn on water, open window, close a door, and sharpen pencil (b) Open a window, push waste basket on floor, ring a bell or play a note on a piano Caution children to try not to lose any in-	Tape recorder	

OBJECTIVES		ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
		formation as they listen. For example, it may even be possible to tell which window was opened by listening to the number of steps taken between the sink and the window.		
J. To learn about the function and care of the sense organs	1.	Use the nystrom wall charts or enlarged drawings to point out and discuss the main parts of the sense organs and nervous system.	Nystrom wall charts "Eye, Ear, Nose and Throat" and "The Nervous System"	
	2.	Show the film, "Animals See In Many Ways." The kind of eyes an animal has, as well as the position of its eyes, are often clue to the animal's way of life.	Film "Animals See In Many Ways" (Xf-a94) Area Ten	
	3.	Put your right forefinger at arms length and the left forefinger about a foot from your nose. Look with the left eye, keeping the right eye closed. Then change eyes. Notice the difference in position of the fingers.	The First Book of the Human Senses, Liberty Publishing Co., Wilson, The Human Body	
	4.	The importance of two eyes in depth perception can be shown by trying to make the points of two pencils meet holding them at arms length with one eye closed.	Perry, Our Wonderful Eyes Zim, What's Inside Me?	
	5.	Put two pennies on a table top and then lower the eyes to a level with the table top. Close one eye and move the coins until you think each is exactly as far from you as the other. Open the other eye to see if you were right.	Cosgrove, Wonders of Your Senses Reidman, The World Through Your Senses	
	6.	The importance of vision to the other senses can be demonstrated by putting one foot behind the other knee and trying to balance with the eyes closed. Repeat with the eyes open.		
	7.	Have the children observe the action of their own iris by covering one eye and looking in a		

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
J. To learn about the function and care of the sense organs	mirror with the other. When the hand is removed from the covered eye, it is possible to watch the pupil become smaller.		
	8. The purpose of two ears can be shown by blindfolding a student and clicking two rocks or hard objects together at different locations around his head. He should be able to detect where the sounds come from.		
	9. Spread compass points apart and touch a student's neck lightly several times with one or two points. Vary the distance the points are separated and see if he can tell if one or two points are used. Repeat on other parts of the body such as the finger tips.		
	10. Blindfold a student and have him hold out his bare arm. Touch him suddenly with an ice cube. The quick movement is a reflex action. Relate to a blinking of the eyes or jerking the hand from a hot object.		
	11. One way to demonstrate reaction time is to arrange the class in a circle, holding hands. At a given signal, pass a hand squeeze from child to child as rapidly as possible. Note the time it takes to get back to the starting point.		
	12. Individual reaction time can be demonstrated by having one child with the thumb and finger spread to try to catch an object (such as a ruler) that is suddenly dropped through his hand by another student.		

JUNIOR HIGH LEVEL...

ANIMALS



Junior High Level

STUDY OF ANIMALS

Instruction at this level should be highly functional. Information gained should re-emphasize objectives stressed at earlier levels and be extended into areas which effect life situations. As an example, classification is needed only for purposes of distinguishing which animals and insects may be harmful and should be controlled from those which are helpful and warrant conservation. Practices of insect control and animal conservation should be guided.

A listing of specific material to be presented during the teaching of units on animals should contain suggestions similar to the following: Insects: Harmful and Helpful, Animals Used by Man, and Animals for Pleasure.

General Objectives For the Study of Animals

Junior High Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:
  A. Animal structure for specific purpose of survival
  B. The fact that man is dependent on plants for his food, received indirectly through food producing animals
  C. The fact that animals may be social
  D. The fact that animals may change
  E. Varied kinds of reproduction in animals

II. To develop ability in relation to:
  A. Recognition of animals which are used for food

- B. Recognition of animals from which man gets clothing and other materials
- C. Recognition of animals which may be harmful to man
- D. Recognition and control of insects which may be harmful
- E. Procedures for eliminating harmful animals and insects
- F. Differences among mammals, birds, reptiles, amphibians, fish and insects
- G. Man's responsibility to an animal taken as a pet or aid
- H. Functional vocabulary related to animals

III. To develop positive attitudes on the part of the students which reflect:

- A. Interest in the importance of animals to man
- B. An appreciation of the practice of conservation

Activities
In the Study of Animals

Initiatory:

1. Bulletin board displays
2. Newspaper accounts of animals used by man or harmful to man
3. Observation of migrating or hibernating animals
4. Unit on foods to stimulate interest in source of meats

Assimilating:

1. Field trips to a meat market, farm, tannery, and riding stable
2. Speakers such as an animal trainer, exterminator, or farmer (one who raises animals for food)
3. Bulletin boards
   - a. Illustrations of meats and animal which is source of it
   - b. Classification charts (functional) of animals and insects
   - c. Pictures of property damage possible by animals and insects

    - d. Illustrations of animals which do work for man
    - e. Illustrations of insects and animals which may bear disease
4. Related individual and group activities
    - a. Oral reports on caring for pets or animal used for work
    - b. Experience chart accounts of field trips, classification information, points of insect control, etc.
    - c. Seatwork related to identifying meat and animal source, harmful insects, use of insecticides (safety and effectiveness) and other functional learning
    - d. Display of materials which come from animal sources
    - e. Make posters for wildlife conservation
    - f. Experiments with animal reproduction (i.e., chick embryo or fish)
    - g. Discuss hobbies and leisure time activities in which animals may be included (hunting, fishing, bird watching, aquarium, raising rabbits or chickens)

Culminating:

1. Review experience charts
2. Prepare "T.V. Program" telling how an animal is raised for use as food - from birth to the dinner table. Have commercials advertising why a certain brand of meat is good

JUNIOR HIGH LEVEL ··

PLANTS

Junior High Level

STUDY OF PLANTS

Instruction related to plants should be provided within a specific functional basis. Knowledge of plants which may be used by man and skill in this use are the ultimate goals for learning acquired at this level.

A listing of specific material to be presented during the teaching of units on plants should contain suggestions similar to the following: How a Plant Gets Food and Stores Food, Plant Reproduction, Plants as Food for Man, Plants Used for Clothing, Plants Used for Shelter, Plants for Decoration, and Plants for Preservation of Land and Soil.

General Objectives
For the Study of Plants

Junior High Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:
   A. Seasonal affects upon plant life
   B. The effect of harmful bacteria upon foods
   C. The fact that some plants make their own food and others do not
   D. Classification of plants according to structure
   E. Recognition of plants used in clothing

II. To develop ability in relation to:
   A. Providing conditions and care necessary for healthy plant life
   B. Identifying plants according to food value
   C. Functional vocabulary related to plant life
   D. Preparing plant life for use as food and shelter
   E. Raising and arranging plants for decoration

F. Preservation of food

G. Practices of conservation related to plant life

III. To develop positive attitudes on the part of students which reflect:

A. An awareness of the importance of plant care to the survival of man

B. Intention of practicing conservation habits related to plants

C. Desire to use plant life most effectively for use by man

Activities
In the Study of Plants

Initiatory:

1. Use unit on Foods to stimulate interest in plant life and growth
2. Display posters for plant conservation, uses of plants, gardening, floral arrangements, etc.
3. Have interesting plants and floral displays within classroom
4. Serve edible raw vegetables to class

Assimilating:

1. Field trips to gardens, market, greenhouse, cannery, refrigeration plant and farm
2. Speakers such as Homemaking teacher, conservationist, food producer, lumber industry representative, and florist
3. Bulletin boards
    a. Illustrations of plant structure
    b. Posters on how man uses plants
    c. Illustrated steps and methods of food preservation
    d. Conservation posters
    e. Floral arrangement descriptions

    - f. Pictures of plants (in original state) and processes of changing the form for clothing materials
    - g. Illustrations of uses of trees
4. Related individual and group activities
    - a. Discuss possible projects involving plant life (i.e. flower or vegetable gardens, unit on preserving food
    - b. Make experience charts on procedures of growing plants, preserving food, types of plants, uses of plants
    - c. Make notebook of experience chart information
    - d. Grow plants, experimenting with use of fertilizer, different types of soil, amount of water, sunlight and air
    - e. Use instruction guides and teacher assistance in making floral arrangements
    - f. Experiment with bread to learn how mold forms
    - g. Experiment with refrigeration of food and non-refrigeration of food. Include written observations in notebook
    - h. Dramatize a story which depicts man's use of plants
    - i. Use seatwork activities to learn food value of plants
    - j. Experiment with different methods of plant reproduction
    - k. Prepare a raw vegetable for eating, noting sanitation practices and parts of plant which are not edible
    - l. Make display of different woods found locally

Culminating:

1. Raise class garden (include vegetables and flowers)
2. Have display of floral arrangements

SAMPLE EXPERIMENTS ON PLANTS - JUNIOR HIGH LEVEL

Objective: To learn that planting seeds is not the only way to get new plants

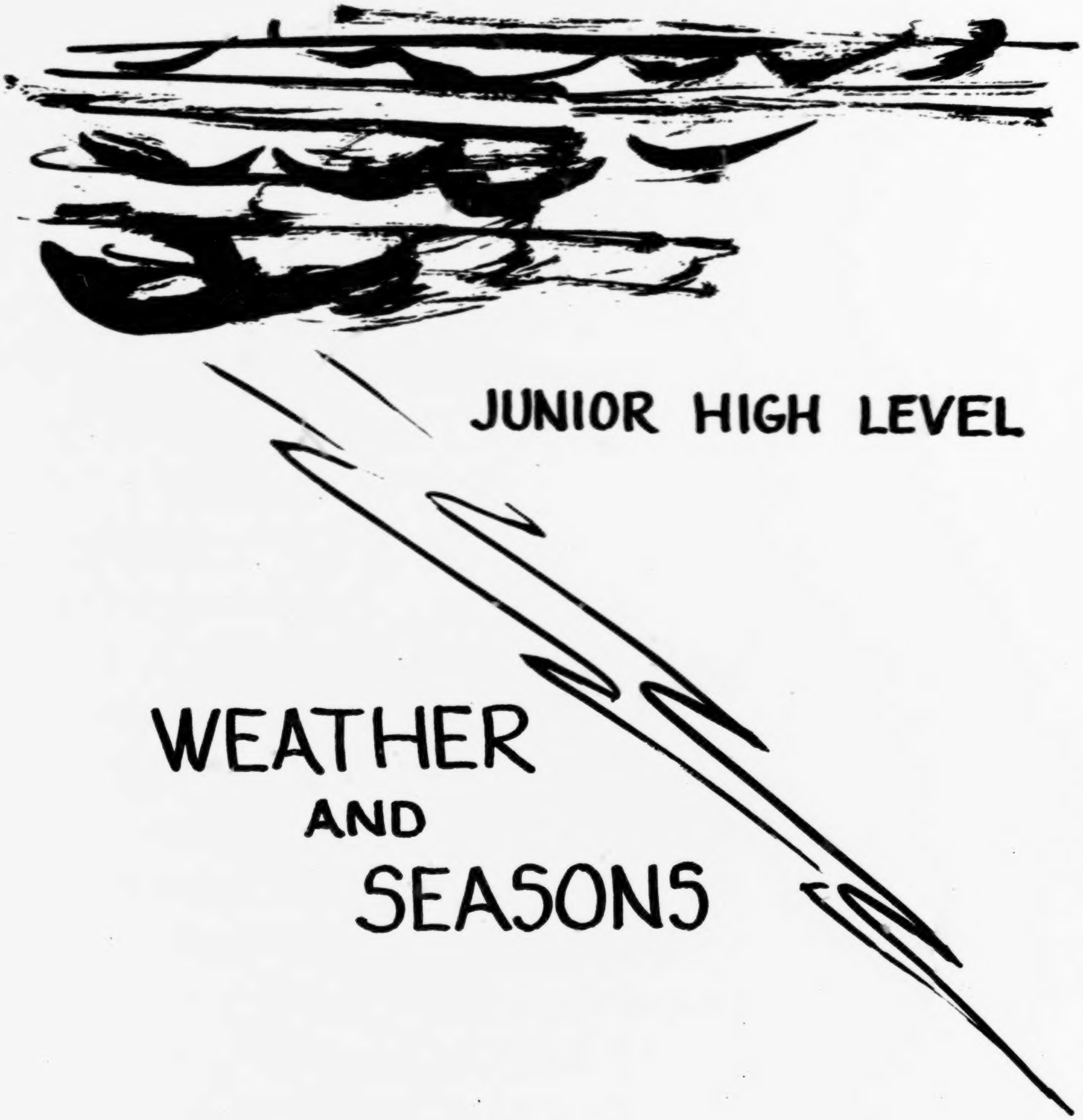
Experiment: Plant a sweet potato in a jar of water. The resulting vine is often used for decoration. Explain that sweet potatoes are enlarged roots which have stored up food.

You can also cut some plants and put the stems in water. They will root and then you have a new plant. Try this with pussy willows, philodendron, or Begonia

Some plants can be grown from leaves. African Violets can be started this way.

Objective: To stress need for cleanliness in handling food.

Experiment: Provide two glass jars which have been sterilized and have covers which may be screwed on very tightly and two unpeeled potatoes. Allow two students to peel the potatoes - one student should thoroughly wash his hands before peeling his potato and sealing it tightly into the jar. This jar is labeled, "washed hands." The second student does not wash his hands before peeling and labels his jar (in which the potato is tightly sealed) "unwashed hands." The jars are set aside for class to observe which jar has mold form in it.



JUNIOR HIGH LEVEL

WEATHER AND SEASONS

Junior High Level

STUDY OF WEATHER AND SEASONS

At the junior high level, students should gain further insight into the causes of weather. This should be used for the purpose of increased skill in adapting to and anticipating changes effecting them. They should have sound concepts of basic changes occurring with the different seasons. The distinction between weather and climate should be made clear to them.

A listing of specific material to be presented during the teaching of units on weather and seasons should contain suggestions similar to the following: Weather and Climate, Clouds, Air, Wind, Water, Seasons.

General Objectives
For the Study of Weather and Seasons

Junior High Level

I. To develop the ability to respond in social conversation or to identify through sensory experiences:

   A. The factors responsible for weather

   B. The different types of climate

   C. Terms publicly associated with weather and seasons

   D. Some technical instruments used to register effects of weather

II. To develop ability in relation to:

   A. Recognition of different types of clouds and the weather implications

   B. Specific causes for and characteristics of the four seasons

   C. Identity of occupations which are seasonal

   D. Functional vocabulary related to weather and seasons

   E. Distinguishing between weather and climate

   F. Identity of various types of precipitation

III. To develop positive attitudes on the part of students which reflect:

- A. Appreciation of cause and effect as demonstrated by weather
- B. Use of weather information

Activities
In the Study of Weather and Seasons

Initiatory:

1. Daily comparison of weather predictions to actual weather conditions
2. Discussion of weather project such as a weather station

Assimilating:

1. Field trips to a weather bureau and on exploratory walks to observe and discuss indications and effects of weather
2. Speakers such as weather analyst or science specialist
3. Bulletin boards
    - a. Illustrations of a home-made weather station
    - b. Illustrations of wind movement and effect on various objects
    - c. Uses of wind (i.e., spreading seeds, drying clothes, moving a boat and kite, wind mill)
    - d. Movement of earth around sun
    - e. Types of clouds and weather they indicate
4. Related individual and group activities
    - a. List seasonal jobs which may be obtained by students (i.e., cleaning sidewalks, raking leaves, mowing lawns, planting seeds and bulbs)
    - b. Discuss technical terms used in television weather reporting
    - c. Draw illustrations of types of clouds and indications

d. Draw illustrations of forms of precipitation and write in explanation (i.e., rain: clouds give up their moisture, dew: moisture in the air forms on cooler surfaces, snow: rain that crystallizes before hitting the ground, frost: moisture in the air which freezes on objects)

e. Check indoor and outdoor thermometers for comparison of temperatures

f. Make weather instruments to observe outside classroom

g. Discuss daily which routine activities might be effected or prompted by current weather conditions

h. Discuss smog; its causes (smoke, pollen, dirt) and effects (poor plant growth, unpleasant irritation to eyes and lungs)

i. List different climates and effects in varied areas of our country

j. Keep large chart of weather conditions for a month. Compare and present a "television" socio-drama of a summary comparison

k. Use experience chart to record comments of daily effect upon class members by existing weather conditions

l. Use seatwork lessons to indicate understanding of weather and seasons

Culminating:

1. Review experience charts for summary and for evidence of new habits from learning

SAMPLE EXPERIMENTS ON WEATHER AND SEASONS - JUNIOR HIGH LEVEL

Objective: To show illustration of water cycle.

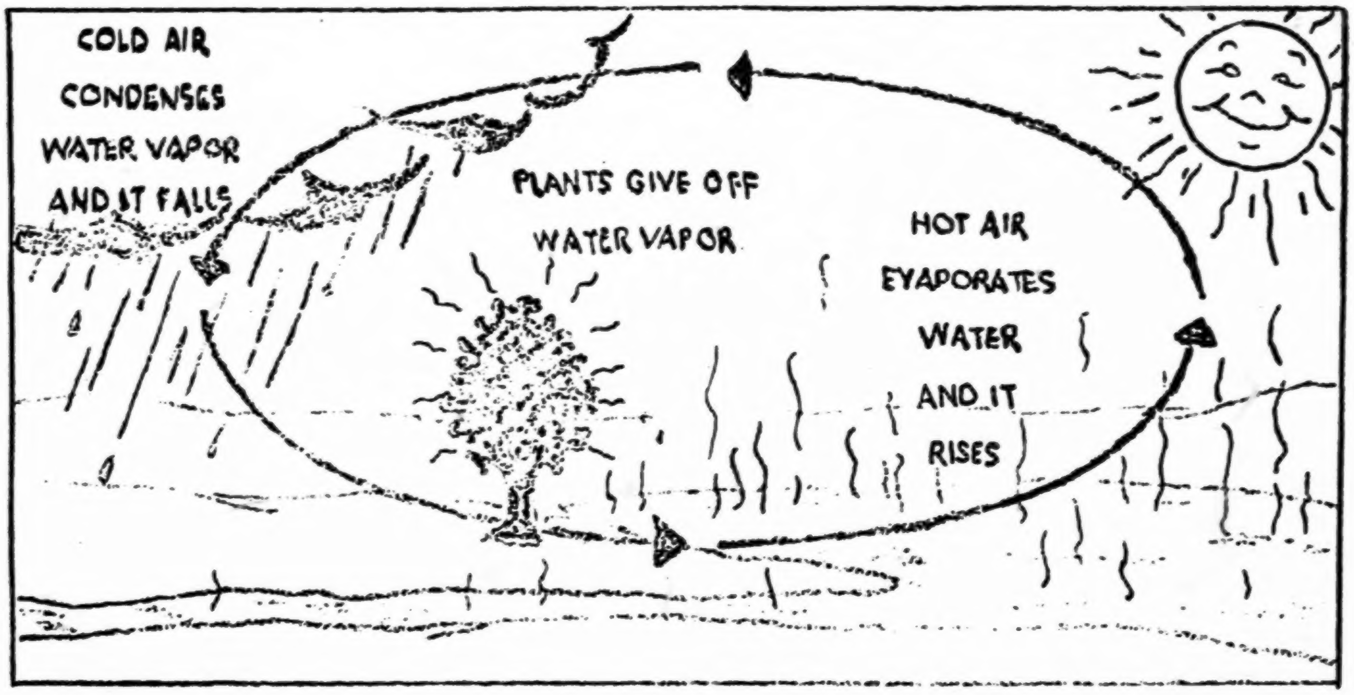

COLD AIR CONDENSES WATER VAPOR AND IT FALLS
PLANTS GIVE OFF WATER VAPOR
HOT AIR EVAPORATES WATER AND IT RISES

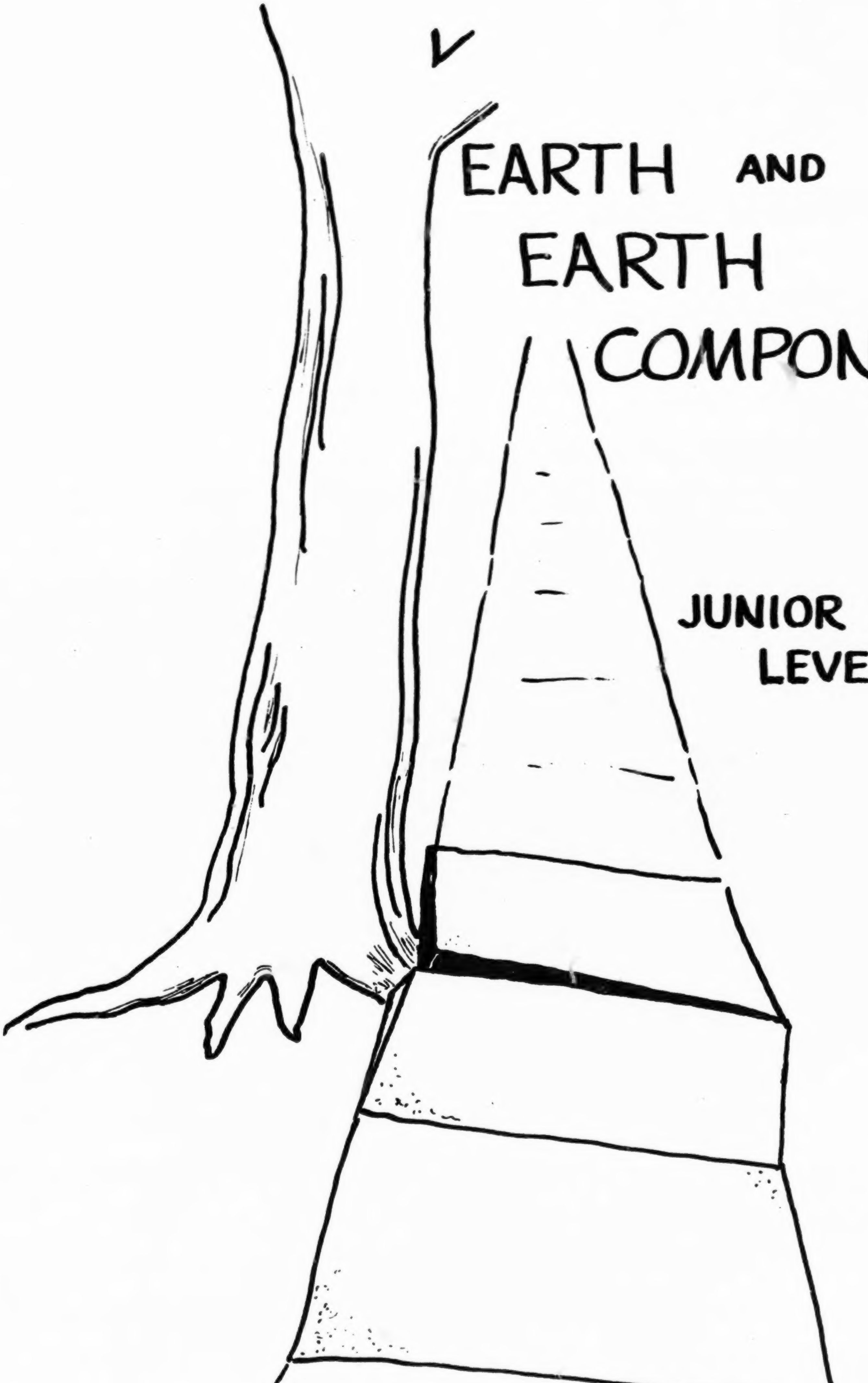
Illustration: (above) Precipitation in the form of rain, sleet, hail or snow is caused by the water cycle. The sun evaporates the water on the earth's surface and the vapor is carried up into the atmosphere by rising hot air until it comes in contact with hot air masses. The cold air condenses water vapor and it falls.

Weather Instruments for Students to Make

1. Make a wind vane by putting a long pin through a spool. Set a soda straw on the pin so that it can turn freely. Glue a paper arrow to the straw.
2. Make an anemometer. Staple the handles of some paper cups to a paper plate. Set the plate on a pin on the end of a stick so that it can turn freely.
3. Make a barometer. Fasten a piece of balloon over the top of a bottle with a rubber band. One end of a straw should be fastened, parallel to the ground, to the balloon with a drop of rubber cement. A pin should be fastened to the other end. Changes in pressure on the rubber can be seen and measured by a chart.

EARTH AND EARTH COMPONENTS

JUNIOR HIGH LEVEL . . .



Junior High Level

STUDY OF EARTH AND EARTH COMPONENTS

A retarded student should acquire sufficient factual information related to the earth and earth components to provide him with a basic understanding of his environment. Recognition of buildings, water from faucets, statues of marble, and roads made of concrete or asphalt, as examples of man's use of natural resources, help attain such a goal. Science learning should provide explanations of natural and man-made products which occur as integral parts of the physical environment. The retarded individual will benefit from such learning by being better able to relate successfully within an environment which he accepts and understands. One of the purposes of this area of study is to replace the fear, mystery and awe, which often complicate the teaching of science to the retardate, with well-founded knowledge.

A listing of specific material to be presented during the teaching of units on the earth and earth components should contain suggestions similar to the following: Kinds of Rocks and Their Uses, Common Minerals, Common Metals, Gems, Uses of Soil, Soil Conservation, and Water Conservation.

General Objectives
For the Study of Earth and Earth Components

Junior High Level

I. To develop the ability to respond in social conversation or to identify through sensory experiences:

   A. The shape and comparative size of the earth

   B. Existence of a variety of natural resources valuable to man

   C. Basic differences in minerals

   D. Relationship of Earth to other planets

II. To develop ability in relation to:

  A. Recognition of uses of rock by man

  B. Functional vocabulary related to the earth and earth components

  C. Practices of soil and water conservation

  D. Recognition of sources of water

III. To develop positive attitudes on the part of students which reflect:

  A. An appreciation of man's use of natural resources

  B. Practices of conservation integrated into life activities

Activities
In the Study of Earth and Earth Components

Initiatory:

1. Display of rock collection
2. Discussion of land changes, effects of weather or man's disruption of earth surfaces
3. Soils display and pictures of erosion, well-tilled soil, etc.

Assimilating:

1. Field trips to rock quarry, construction site, water works, and exploratory walks for observation of stagnant water, erosion, rock layers, effect of plants upon soil.
2. Speakers such as conservation officer and geologist
3. Bulletin boards
   a. Representations of Earth in relation to Solar System
   b. Pictures of varied rock types and formations
   c. Illustrations of man's uses of soil, rock and water
4. Related individual and group activities
   a. Use experience charts to record observations and learnings
   b. Seatwork to reinforce functional learning

- c. Sensory experiences with rocks and soil for differentiation of consistency, form and texture
- d. Experiments with rocks and soil to show effects of water, plants, action of man, etc.
- e. Discussions, demonstrations, and reading to identify metals, gems, and common minerals
- f. Display of rocks to be classified by students
- g. Use of magnifying glass and available science equipment to examine properties of rock, soil and water
- h. Practice various methods of ventilating a room
- i. Construct a frieze on harmful and helpful effects of water
- j. Develop bulletin board display on construction materials from natural resources
- k. Write letters to conservation services for printed information

Culminating:

1. Prepare and dramatize a program presenting conservation practices which should be a part of daily life

SAMPLE EXPERIMENTS ON EARTH AND EARTH COMPONENTS - JUNIOR HIGH LEVEL

Objective: To show that air exerts pressure

Experiment: Acquire an empty can of one-gallon size with a screw-on cap and pour in a cup of water. Place over burner and bring to a boil for several minutes. The steam will force air out of the can. Remove from the flame and screw on the cap quickly. Let the can cool and watch it cave in. As the steam inside cooled and condensed there was nothing to exert an outward pressure and the can was crushed by the pressure of the outside air.

Objective: To show that there is air in the soil

Experiment: Put some soil or sand in a beaker. Cover it with water and then watch the bubbles rise.

JUNIOR HIGH LEVEL . . .

UNIVERSE

Junior High Level

STUDY OF THE UNIVERSE

The continuing goals of developing awareness and learning from observation should accompany instruction at this level. Familiarity with the solar system as it relates to current space programs will allow students some understanding of news items. Review of information presented at the intermediate level will probably be beneficial.

A listing of specific material to be presented during the teaching of units on the universe should contain suggestions similar to the following: *Causes for Days and Years*, *Our Space Program*, and *How the Sun Helps Man*.

General Objectives
For the Study of the Universe

Junior High Level

I. To develop the ability to respond in social conversation and through sensory experiences:

   A. Space exploration as important to man

   B. (Objectives cited for Intermediate Level)

II. To develop ability in relation to:

   A. Using observation for development of questions and simple research

   B. Functional vocabulary related to the universe and space exploration

   C. Recognizing that man uses heat and energy from the sun

   D. Explanation of the effects of the rotation of the earth

   E. Recognition of some reasons for space exploration

III. To develop positive attitudes on the part of students which reflect:

   A. Appreciation for man's use of the sun

   B. Interest in space efforts which may benefit mankind

Activities
In the Study of the Universe

Initiatory:

1. Pictures of space flights and programs in progress
2. Illustrations of uses of the sun for heat and energy
3. Incident of eclipse to motivate interest

Assimilating:

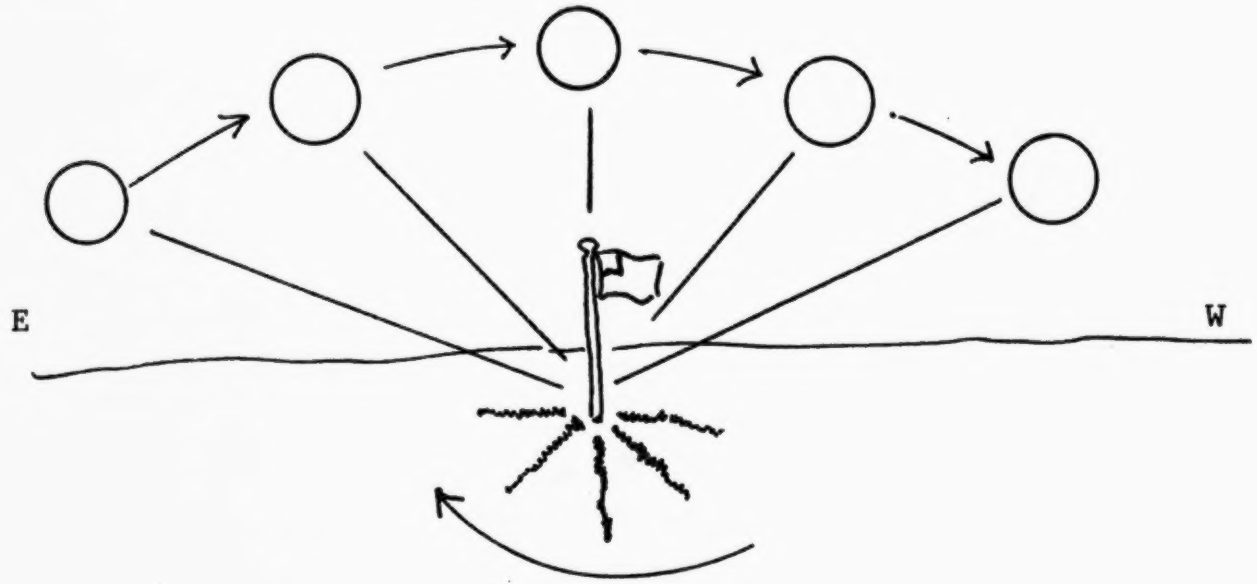
1. Field trips such as exploratory walks to observe earth curvature, stars visible in early morning sky, and evening observations if possible.
2. Speakers such as a person with particular knowledge of space program or science specialist
3. Bulletin boards
    a. Magazine and newspaper items and pictures related to space exploration
    b. Representations of solar system
    c. Illustrations of uses of the sun
4. Related individual and group activities
    a. Experiments showing rotation of earth, sun and moon
    b. Review of pertinent activities from intermediate level
    c. Experience chart accounts of studies
    d. Class reports on rockets and satellites
    e. Experiments with heat from the sun

Culminating

1. Review experience charts
2. Dramatize space flight with suggestions of what might be found if one landed on another planet

SAMPLE EXPERIMENTS IN STUDY OF THE UNIVERSE - JUNIOR HIGH LEVEL

Objective: To show the apparent motion of the sun in the sky



Experiment: Before the class begins in the morning and every 1/2 hour during the school day have a student mark on the ground the position of the flagpole shadow. (See illustration above). When the last mark is made have the whole class observe as you line up the marks on the ground with the top of the flagpole and they will be able to determine the path of the sun in the sky. Point out that this is the "apparent" motion of the sun.

JUNIOR HIGH LEVEL . . .

FORCES

Junior High Level

STUDY OF FORCES

The topics covered in this section of the suggested science activities are related primarily to actual life experiences. The degree of comprehension experienced by students will affect the ease with which they face many physical tasks. The teaching of skills in the use of tools and machines which require a basic understanding of forces is the overall goal of this area.

A listing of specific material to be presented during the teaching of units on forces should contain suggestions similar to the following: How Man Learned to Use and Control Fire, Electromagnets, Simple to Complex Machines, How Sound Travels, and Fuels Which Power Machines.

General Objectives
For the Study of Forces

Junior High Level

I. To develop the ability to respond in basic social conversation or to identify through sensory experiences:

   A. That sound waves may travel through solids, liquids and gases

   B. The fact that fuel, oxygen and heat are needed for burning to take place

   C. That many forms of energy can be changed into electrical energy and electrical energy may be changed into other forms of energy

   D. That gravity is a force which holds things down

   E. The definition and effect of automation

II. To develop ability in relation to:

   A. Recognition of the fact that vibrations cause sound and change in vibrations cause changes in sound

B. Using the voice effectively as an instrument of sound

C. Recognition of examples of force, work, and energy

D. Fire safety practices

E. Recognition of substances which burn and release energy

F. Recognition of principle and use of:

   1. An electromagnet

   2. A dry cell battery

   3. Air pressure

   4. A ramp

   5. Pulleys, levers, and wedges

   6. The wheel

G. Recognition of uses for electrical energy

H. Use of safety with electricity

I. Methods of care for equipment

J. Recognition of fuels used to power machinery

K. Following directions

L. Recognition of common tools and uses for them

M. Using mechanical devices found in public places (i.e. pay telephone, elevator, vending machines, etc.)

III. To develop positive attitudes on the part of students which reflect:

A. An appreciation of knowledge of sources of energy

B. An appreciation of the importance of wise use of energy

C. Practice of safety with use of forces and energy

Activities
In the Study of Forces

Initiatory:

1. Display of examples of machines such as lever, pulley, wedges, etc.
2. Fire Prevention Week preparation

Assimilating:

1. Field trips to an electrical generating plant, machine shop, public self-service elevator, location of vending machines, public telephone booth, etc.
2. Speakers such as an electrician, a machinist, fire chief, etc.
3. Bulletin boards
    - a. Comparative illustrations of automation and manual labor
    - b. Illustrations showing sound travelling through varied solids, liquids, and gases
    - c. Illustrations of complex machines based upon simple machines with which class is familiar
    - d. Posters on safety with fire, electricity and machines
    - e. Illustrated steps for proper care of tools and equipment
    - f. Illustrated steps to aid in learning to use and follow directions
4. Related group and individual activities
    - a. Experience chart record of functional rules, directions and related learning
    - b. Seatwork for reinforcement and evaluation of related learning
    - c. Experiences with tuning fork, telephone and other sound devices
    - d. Demonstrate the use of magnets in daily life (can openers, knife racks, tack hammers, etc.)

- e. Read and discuss stories about how man learned to use and control heat
- f. Demonstrate the inclined plane and list ways in which it is used
- g. Demonstrate the principle of the level and fulcrum as it relates to moving objects from a low level to a higher level
- h. Demonstrate how a simple engine works
- i. Use experiment of pouring vinegar over a mixture of baking soda and water to show chemical change. Relate this to examples such as bread-baking and extinguishing fires
- j. Use tarnished pennies for comparison of soaking in soap and water with soaking in salt and vinegar. Use this example to show how certain common household cleaners work more effectively than others for certain purposes
- k. Make an electromagnet and display familiar items which use the principle of an electromagnet for power (i.e. doorbells, chimes, motors, and switches)
- l. Show how electricity is changed to light by attaching the terminals of a dry cell battery to a flashlight bulb
- m. Discuss the force of gravity, using examples of dropping objects (familiarity with current space programs may allow use of examples of "floating in space" beyond the pull of gravity)
- n. Practice care of equipment with oiling parts, tightening screws, bolts, nails, etc.
- O. Practice efficient use and care of simple machines

Culminating:

1. Present socio-drama illustrating frequent uses of simple machines,

use of tools for care of the equipment, and care of tools and machinery

2. Review experience charts and compile a booklet of tips on uses of forces

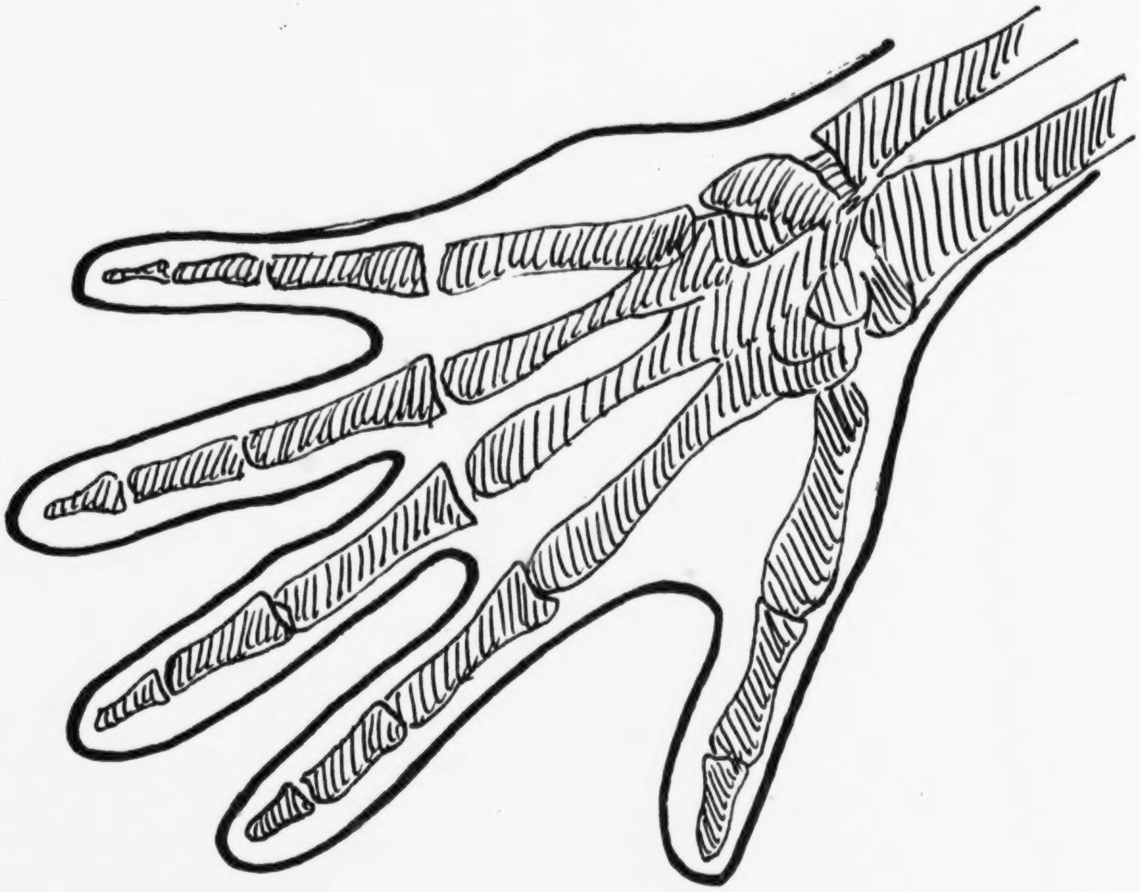
SAMPLE EXPERIMENTS ON FORCES - JUNIOR HIGH LEVEL

Objective: To experience sound travelling through solids

Experiment: While one student places his ear against one end of a table, another taps lightly on the other end with a pencil. (This is the method Indians used when placing their ear to the ground to hear approaching horsemen.)

Objective: To show that sound travels through liquids

Experiment: Strike a tuning fork against a hard surface. Immerse it into the surface of water. The sound waves are evidenced by the ripples in the water.



JUNIOR HIGH LEVEL

HUMAN

Junior High Level

STUDY OF HUMAN BEINGS

The goals of studying the human should be twofold. Students should first acquire general knowledge of the body systems sufficient to aid them in caring for their bodies and recognizing symptoms of illness and disease. Because it is assumed that some such teaching will be covered in Health areas, the content coverage is somewhat limited in this section. The second goal of this area of study is that developing ability in adapting to environmental change and awareness of the interdependencies among living things.

A listing of specific material to be presented during the teaching of units on the human should contain suggestions similar to the following: The Digestive Systems, The Respiratory System, The Circulatory System, The Nervous System, The Skeletal System, The Reproductive System, Body Needs: Air, Water, Food, Protection, and How Man May Change His Environment to Meet His Needs.

General Objectives
For the Study of Human Beings

Junior High Level

I. To develop the ability to respond in social conversation or to identify through sensory experiences:

   A. That the digestive system makes food ready to be used by the body

   B. That the skeletal system supports the body

   C. That the circulatory system carries blood from the heart to all parts of the body

   D. That the heart pumps blood to all parts of the body

   E. That the respiratory system supplies the blood with oxygen and rids it of carbon dioxide

F. That the brain keeps the parts of the body working together

G. That the reproductive system enables man to reproduce life in his own form

H. That man, through the ages, has improved his methods of changing environment to meet his needs

II. To develop ability in relation to:

A. Using good posture habits for better general body function

B. Recognizing proper habits of nutrition and elimination as necessary for good health

C. Providing fresh air and good breathing procedures for better functioning of the respiratory system

D. Recognition of signs of illness or disease

E. Using the mind for solution of problems presented within the environment (i.e., such problems as heat, cold, rain, thirst, hunger, pain)

III. To develop positive attitudes on the part of students which reflect:

A. An appreciation of reasons for good health practices

B. An acceptance of man's ability to adjust to environmental changes and to change the environment to meet his needs

C. An appreciation of the structure of the human body and the stamina provided to man by its functioning

Activities
In the Study of Human Beings

Initiatory:

1. Posters and models displaying body systems
2. Class discussion of illness or health problems

3. Pictures of prehistoric living conditions improved by man

Assimilating:

1. Field trips to construction sites or health displays
2. Speakers such as school nurse, dentist, and archaeologist
3. Bulletin boards
    a. Posters of body systems
    b. Charts on care of teeth, skin, and exercises
    c. Illustrations showing man's adjustment to environmental conditions
    d. Illustrations of man's ability to change environment to meet his needs
    e. Charts representing signs of illness or disease
4. Related group and individual activities
    a. Experience chart recordings of learning
    b. Seatwork for reinforcement and re-emphasis of learning
    c. Practice of good posture habits, with model demonstrations of effect upon body organs
    d. Construction of booklet with rules for good health, emergency procedures for body safety and signs of illness or malfunction of body parts
    e. Socio-drama in which student is asked to act out solution of problem requiring adjustment to or change of environment
    f. Read texts and make reports on body systems and the important care required for maintenance
    g. Consider man's basic needs and how they are met

Culminating:

1. Make survival kits for use in case of dire weather conditions,

situation in which person is stranded away from conveniences, or in case of nuclear attack

2. Keep individual health charts and record any progress noted from habits acquired during class study

Starter Unit

Junior High Level

THE WEATHER

This unit was originally written by Emogene Mangold for a course in Curriculum Development for the Mentally Retarded at the University of Iowa.

I. SELECTION OF UNIT - THE WEATHER

A unit was selected on weather as it offers an opportunity for the children to better understand the variable weather conditions of their state. The children should know how to dress on chilly days, very cold days, hot days, as well as when it rains or snows.

They need to know how the weather can affect their leisure time, vacation plans, and work plans.

This unit would be started in the middle of February and extended through the month of March. March was chosen as it is the most variable of months. We usually have at least one snow storm in that month as well as rain, sleet, sunshine, winds and sometimes even thunder storms.

If the children understand more readily what causes the different weather conditions, they will be less apt to fear extreme weather changes. They will learn safety precautions they can make.

The scope and flexibility of the topic should allow transfer to other units at the appropriate time.

II. SUB-UNITS

1. Seasons
2. Measurement
3. Health
4. Vocations
5. Clothing
6. Communication
7. Leisure time
8. Safety
9. Vacation time
10. Time
11. Health

III. GENERAL OBJECTIVES

I. To recognize that air is all around us, can move, and has no color (Lesson 1)

II. To recognize that air takes up space (Lesson 2)

III. To recognize that air carries seeds (Lesson 3)

IV. To be able to identify that many things are in the air (Lesson 4)

V. To identify specific characteristics of the different seasons (Lesson 5)

VI. To recognize the natural elements of wind, thunder and rain and their effects upon living things and upon the earth

IV. ACTIVITIES FOR CORE AREAS

A. Arithmetic Concepts

1. Use a calendar to show the dates for keeping track of weather conditions
2. Measure precipitation: rain, snow
3. Read a thermometer, inside and outside, under different weather conditions
4. Learn dates, by months, day and year
5. Keep a weather calendar
6. Keep a weather chart

B. Social Competencies

1. Discover how we can use air for fun: balloons, whistles, kites, blowing bubbles and sail boats
2. Visit farmers and other outdoor workers to learn how the weather affects their work
3. Discover the ways weather helps us play in the different seasons
4. Find all the signs of spring and list them, or diaplay
5. Plan an ideal vacation
6. Plan a trip to the weather station
7. Learn to follow directions, whether oral or written

C. Communicative Skills

1. Keep a daily weather chart
2. Make a bulletin board showing all the signs of spring
3. Keep daily experience charts. Write them in class
4. Read daily experience charts
5. Read daily weather reports from the newspaper
6. Make weather booklets
7. Visit the U.S. Weather Station and relate the experience
8. Write thank you note for the opportunity to visit the weather station
9. Listen to stories and records concerning different weather
10. View films concerning weather and discuss. Use experience chart in connection with the films
11. Listen to resource people about their jobs in relation to the weather
12. Compose a story that features a weather change such as a wind storm, flood, or blizzard
13. Illustrate the above story
14. Illustrate the different weather conditions creatively
15. Learn functional vocabulary

D. Health

1. Demonstrate the types of clothing to be worn for a specific weather condition
2. Exhibit the different play equipment that will be used depending on weather conditions
3. Plan and serve a good winter lunch

4. Plan, make and serve a good hot-weather meal
5. Make charts showing proper food for all seasons
6. Make a check list on good health rules pertaining to a particular season, as well as in general

E. Safety
   1. Make posters showing winter safety, and include ice, snow, and severe storms, such as blizzards
   2. Make a winter safety booklet
   3. Make a spring and summer safety booklet that includes storms, water safety, vacation safety tips, and heat wave tips
   4. Have a tornado drill in school and discuss what procedure should be followed in the home

F. Vocational Skills
   1. Observe how the weather conditions effect most outside workers such as farmers, visit with them
   2. Develop big muscles through dramatizing activities such as shoveling walks, skating, jumping, marching, and swimming
   3. Play kick ball to develop big muscles
   4. Take an observance walk to find signs of spring
   5. Discover and discuss how extra money can be earned through seasonal odd jobs such as shoveling walks, mowing lawns, digging dandelions, washing cars and washing windows and putting on screens

V. RESOURCE MATERIAL

- Filmstrips
- Films
- Daily experience charts
- Bulletin boards
- Field trip to Weather Station
- Walks to discover weather changes
- Construction paper
- Tempera and water colors
- Paint brushes
- Scissors
- Magazines and cataloges
- Paste or glue
- Plastic
- Tape recorder
- Story books
- Poem books
- Chart paper
- Seasonal pictures
- Drawing paper
- Newspapers
- Newsprint
- Shelf paper
- Felt tip pens
- Chalk
- Crayons
- Radio
- Music book
- Glass jars
- Glass tubing
- Cork
- Ice cubes

VI. VOCABULARY

- air
- cap
- hot
- wind
- north
- map
- drop
- lightning
- balloon
- boots
- calendar
- January
- May
- September
- Monday
- Friday
- erosion
- snow
- snowflake
- snowdrift
- thunder
- east
- rain
- cold
- smog
- kite
- November
- flood
- dates
- February
- June
- October
- Tuesday
- hail
- thermometer
- Wednesday
- stormy
- Saturday
- flowers
- coat
- heat
- fall
- showers
- south
- Sunday
- water
- cool
- tornado
- heavy
- river
- months
- March
- July
- winter
- spring
- mittens
- summer
- west
- steam
- ice
- umbrella
- light
- slippery
- April
- August
- December
- Thursday

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
1. To recognize that air is all around us, has no color, and can move	Tell the children that air is all around them all the time Have a plastic bag blown up to show them that air does not have color and that air does not have shape Illustrate how air moves by waving a large piece of cardboard and by using an electric fan. A large feather is used with the fan Write experience chart. Read orally Seatwork: Have the children make pinwheels, then experiment with these (use draftiest parts of room); placing them in front of an open window, in front of the fan, and on the children's desks Vocabulary: air, wind	Chart paper Large sheet of cardboard An electric fan 6"x6" construction paper Straight pins 8" long wooden dowel pins A blown-up plastic bag	Display a picture of wind blowing the trees. This is mounted on construction paper. Air Air is around us. Air can move. Air has no color. Air is real.
2. To recognize that air takes up space	Show film Blow up a balloon explaining how we can put air into things. Use two bottles in an aquarium to illustrate how air takes up space Experience chart: Review, write one for today, read orally Seatwork: Duplicate experience chart story. Give one to each child. Keep to put into a booklet Vocabulary: wind, blows, seeds Worksheet #1: Where is Air	"How Air Helps Us" COR 11 min. Balloon Two empty bottles An aquarium Chart paper Ditto Master copy "Where is Air?" "Seeds" author unknown, found on worksheet #2 "Blow Wind" Cornet, 11 min. Worksheet #1	Air can move things. We can see what happens when air moves. We can see what air does when it moves. Air is useful. Picture of seeds. The wind blows the seeds to new places. The seeds will grow into plants. The wind helps us.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIAL	EXPERIENCE CHART
3. To recognize that air carries seeds	Show film "Blow, Wind, Blow" Experience chart: review Write experience chart. Read orally. Duplicate and give to the children Seatwork: Have them illustrate "Seeds", Worksheet #2 Vocabulary: seeds, wind, blow	Chart paper Drawing paper Crayons Ditto Master copy	
4. To be able to identify that many things are in the air	Show pictures and explain them Filmstrip: What is Wind? Experience chart: Review. Write. Read orally. Duplicate Seatwork: Worksheet #3 Vocabulary: birds, fly, air	Pictures of seeds, insects, birds, kites, airplanes, clouds, balloons "What Do We Find in the Air" Worksheet #3 "What is Wind?" Jan Handy film Chart paper Duplicated paper	"We see birds in the air. We can play with balloons and kites in the air. Airplanes and helicopters fly in the air. Birds and insects fly in the air.
5. To identify characteristics of the different seasons	Show different pictures of the weather, the four distinct seasons. Tell story Write experience chart after review. Read orally. Duplicate Seatwork: Illustrate duplicated sheets, use pictures of the seasons from magazines Vocabulary: rain, snow, winter, spring, summer, fall	Magazine pictures of the four seasons. When will the World Be Mine?; Schlein: Walsch, 1950 Duplicating paper Chart paper	Place the four seasonal pictures at the top of the chart. Air can be full of rain or snow. In winter it is cold. It may snow in the winter.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
	their notebooks Vocabulary: snow, skate, play, sleds		We can ski. We can play with our sleds.
8. Ice	Do an experiment with freezing water Read poem on winter by Aldis given two days before Film: Children in Winter Experience chart: Read. Review. Write and read orally Seatwork: As a group construct a winter mural. Make several life-size action figures by having a child lie on a large sheet of paper and draw around him Vocabulary: snow, like, play, ice, cold	Two glass jars A thermometer Film "Children in Winter." Cornet Large sheet of newsprint Child-sized sheets of shelf paper or newsprint Pencils Tempera or crayons Paint brushes Cotton, paste	We like to play in the snow. Water changes form when it freezes. Picture of winter sports on experience chart. We can have fun in the snow. We can skate. We can sled.
9. Work	Show pictures of people working Read: Katy and the Big Snow Experience Chart: Review, read orally Seatwork: Finish group project of the winter mural Vocabulary: winter, work, shovel, play, snow	Pictures of people working Katy and the Big Snow, Burton; Houghton & Co. Snow mural, paper, cotton, paste, tempera paint, and plastic wrap for ice. Paint brush Chart paper	Pictures of people working in the winter. In the winter we can work. We can shovel walks. We can work in the snow. We can play in the snow.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
10. Safety	Show a picture of falling on ice. Do an experiment with ice and salt Film: "Safety in Winter" Experience Chart: Review, write, read, and duplicate. Seatwork: Illustrate the experience chart story with pictures from magazines or original, whichever the child desires Vocabulary: Slippery, ice, fall	Picture of dangerous ice Film: "Safety in Winter"; Cornet Duplicate Chart paper Magazines Scissors Paste, paint, and brushes	Picture of a child falling on the ice. Be careful when you walk on the ice. Do not push people when they are walking on the ice. Do not laugh if someone falls on the ice. Spread salt on the ice for safety.
11. Proper clothing	Show pictures Discuss which is the proper clothing to wear in the winter "Today is March __, the first Monday in March. We shall keep a weather chart for March." Explain the different symbols Read: Too Many Mittens Exchange chart: Review, read, make Seatwork: Select winter clothing from catalogues Vocabulary: warm, cold, cap, mittens	Pictures showing summer and winter clothing Individual weather charts Too Many Mittens, Slobodkin; Vanguard Press Catalogues Scissors, paste Drawing paper Chart paper	Picture of a warmly dressed child. Clothing keeps us warm. It keeps out the cold air and holds in the body heat. We need caps and mittens when it is cold.

If there is time in Lesson 11 all winter scrapbooks would be assembled and a cover made. A review of all the air and winter experience charts could be made, thus "wrapping" up this portion of the unit.

As I wish to illustrate the Spring lessons that would normally come later in the month of March, we shall skip the units on temperature, where we will make a simple thermometer, keep a week's chart of daily temperature both in and outdoors. After the temperature we shall study different clouds.

The simple thermometer is made by placing a cup of water into a glass jar, adding a cap of cork through which a glass tube is inserted. The jar is placed into a larger container and hot water is added to the second container. The water moves up the tube as the jar becomes warmer. The children will see how the thermometer works. They will also learn to read thermometers. They will make individual temperature charts and keep those for a week at a time to illustrate the variations of temperature in March.

OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
12. Spring	Play a tape of "Spring is Here!" Learn and sing Filmstrip: "Spring is Here." Hand out newspaper weather reports and/or the children take turns reading these. One child is to bring a report each day Distribute to the class duplicated words of the song for learning, as well as for saving for a spring scrapbook Start a large bulletin board of "Signs of Spring" for the children to assemble. They are to add to it each day as they see new signs of spring. At the start only bare trees are used, later the children will add buds and leaves of crepe paper Experience chart: Review, write, and read orally Vocabulary: spring, here, grow, grass, flowers, birds	"Spring is Here" *Music Around the Clock* Film: "Spring is Here," SVE Duplicate words for the song Spring picture for experience chart Brown crepe paper Black chalk Green matting Newspapers Tape recorder	Spring picture Spring is nearly here. In the spring the grass grows. Flowers grow in the spring. Soon the birds will be here. The first bird that comes will be a Robin
13. Wind	Play the song, "Spring Song" on tape Show pictures of windy weather. Also show and discuss different kites Filmstrip: What is Wind? Experience chart: Write and read after reviewing Worksheet: Construct kites. Large ones for windows, small for bulletin board Vocabulary: kites, wind, move, air, play	"Spring is Here" *Music Around the Clock* Tape recorder "What is Wind?" JH Construction paper Paints and brushes Chart paper Scissors, paste Crayons String	Picture of kites in the air. Wind is air that moves. Wind can move fast. We like to play with kites in the wind.

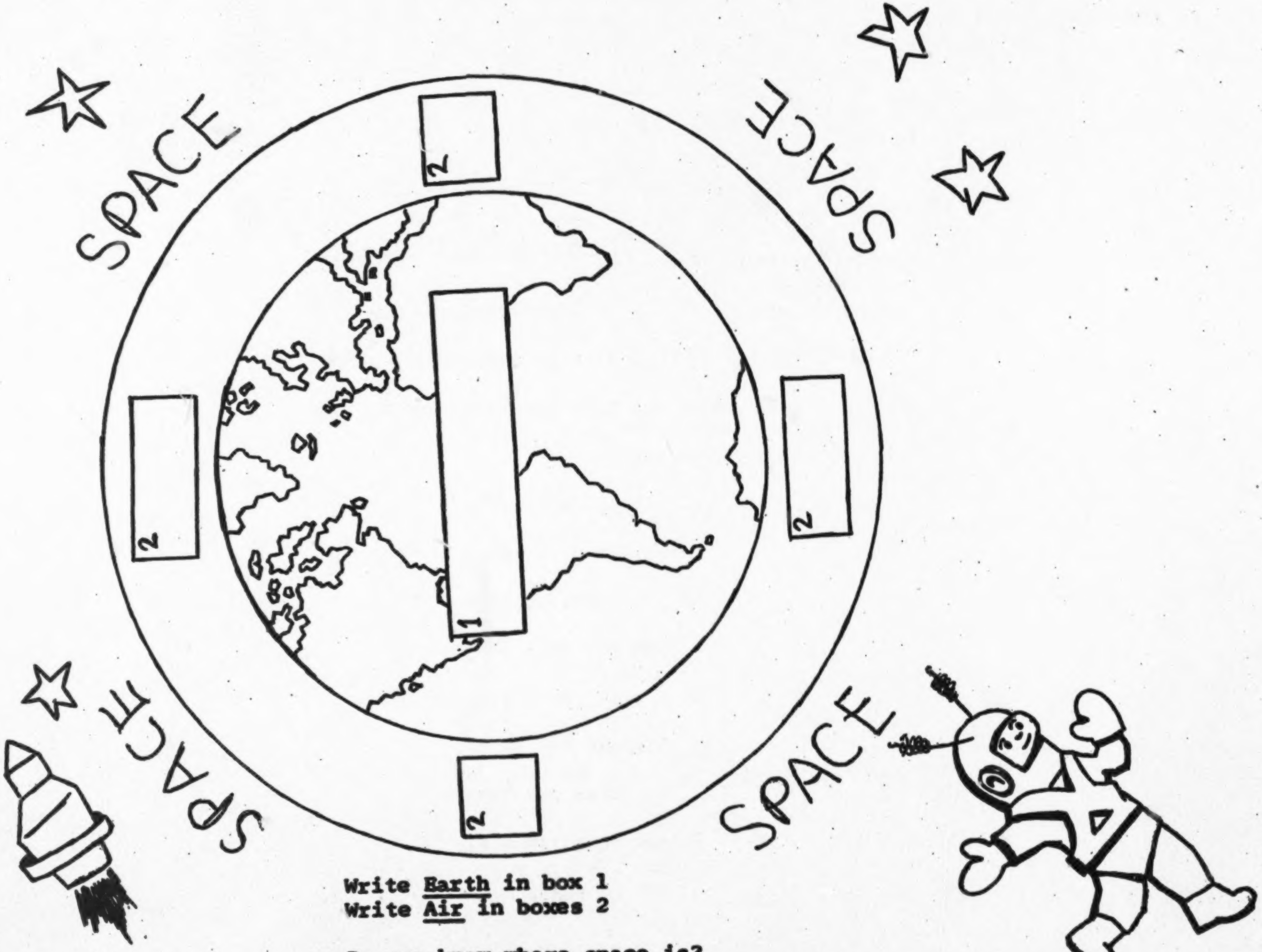
OBJECTIVES	ACTIVITIES	RESOURCE MATERIALS	EXPERIENCE CHART
13. Wind (Cont'd)	Show pictures of windmills, clothes drying, and gliders Read: Peter's Long Walk Discuss taking a walk the first nice day, to find signs of spring Read: "Windy Wash Day" poem Add wind, clothes line, clothes pins and clothes to the bulletin board Experience chart: Review, write, read Seatwork: Do worksheets, following directions Vocabulary: wind, windy, March	Pictures of windmills, clothes drying and gliders Peter's Long Walk, Kingman; Doubleday, 1953 "Windy Wash Day" Dorthy Aldis 2 tinker toy sticks 12" string Picture of wind Paper clothes cut from magazines Seatwork	Picture of wash drying outside, mounted on construction paper. The wind blows and blows. Some days it blows very hard. Some days it doesn't blow at all. In March we have many windy days.
14. Thunder and rain	Show pictures of rain and thunder storms Read: Rain Drop Splash Record: "Rainy Day," "What is Thunder?" Make umbrellas. Add to bulletin board Experience chart: Review, write, and read orally Seatwork: With watercolors make outdoor pictures illustrating rain Vocabulary: sound, flowers, stormy erosion	Pictures: thunder storms, rain "Rainy Day," "What is Thunder?" Educational Records Chart paper Plastic for umbrellas Toothpicks Drawing paper Watercolors, brush	Picture of a stormy spring day. I like the sound of rain. Rain helps the grass to grow. Rain helps the flowers to grow. When rain washes the soil away it is called erosion.

The children's bulletin board would be completed. The children would make simple rain gauges from pill bottles and take these home. The summer unit would include planning vacations, water safety, healthful foods and comfortable clothing. A garden could be started to show how weather helps growing things. In the fall a unit much on the order of this could be easily made incorporating safety, health, and leisure time ideas as well as the other core areas.

In the spring unit several lessons would be devoted to storms to help the child understand them and to control his fear. By understanding what to do during a storm, the child may have less anxiety.

From this unit could be developed a unit on gardens, a health unit emphazing good, wholesome foods, or one on manners.

WHERE IS THE AIR?


SPACE
SPACE
SPACE
SPACE
1
2
2
2
2

Write **Earth** in box 1
Write **Air** in boxes 2

Do you know where space is?
It is beyond air.

[illegible] space ship somewhere in space

Worksheet #1

SEEDS

In a milkweed pod,

Snug and warm,

Seeds are hiding,

Safe from harm.

Open wide the pod,

Hold it high!

Come, strong Wind,

Help them fly.

Author unknown

Finish the sentences with the right word

1. The seeds are in a ___________. Chair, pod

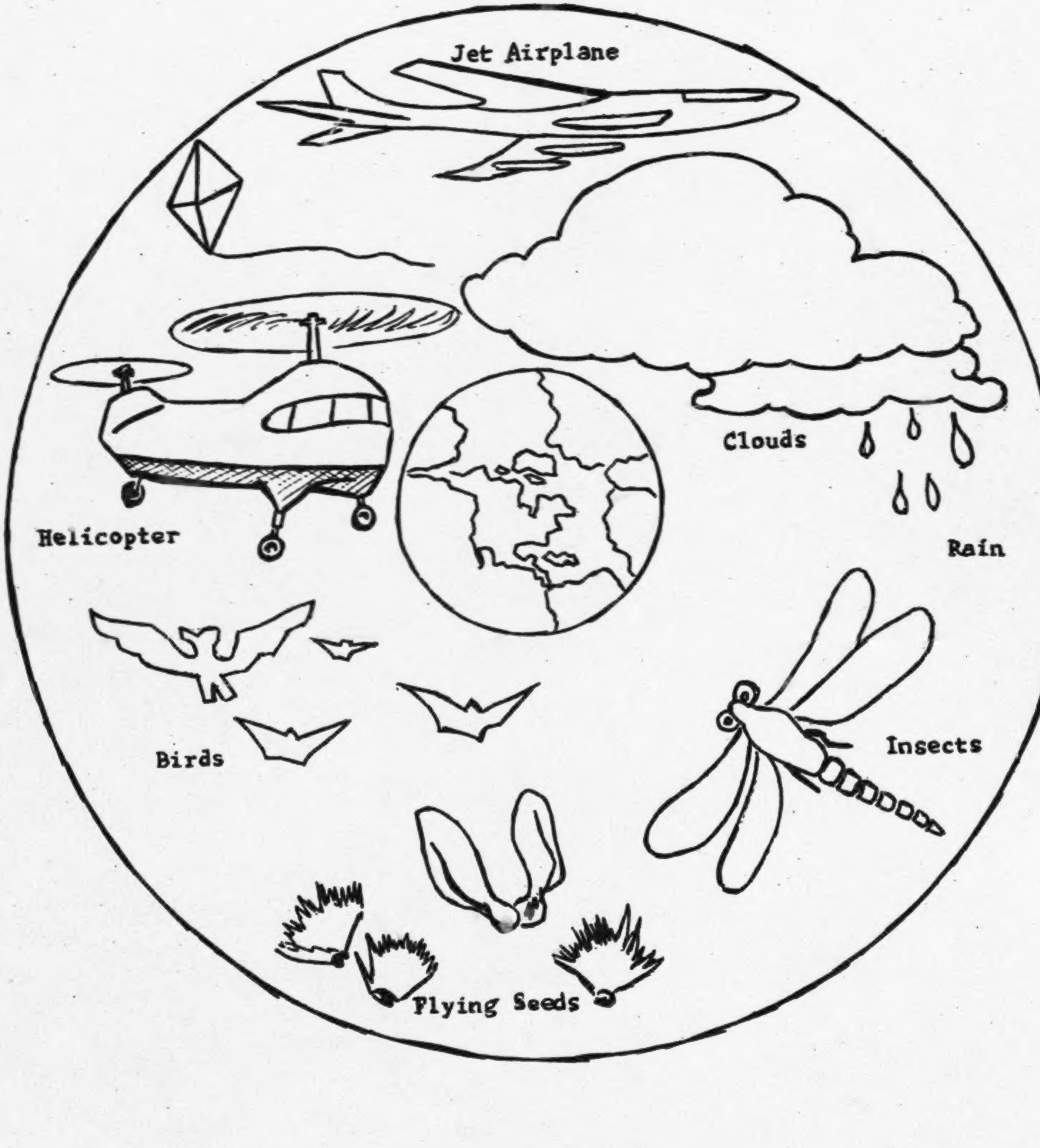
2. The seeds are snug and _______. Cold, warm

3. ______________________, helps them fly away.
The sun, Strong Wind

4. It helps them__________. Swim, fly

Worksheet #2

WHAT DO WE FIND IN THE AIR?


Jet Airplane
Clouds
Helicopter
Rain
Insects
Birds
Flying Seeds

Color, count items.
How many? Add other things.

SECONDARY

Comparatively few new science concepts will be introduced at the secondary level. Most of the teacher's efforts at this level will focus on the provision of functional experiences which allow the student to apply the knowledge he has previously acquired. There will, of course, be some senior high students who are not proficient in the concepts taught in the science curriculum at the lower levels. While the specific number of such students cannot be anticipated, their needs for review and remedial work must be considered when planning the science program at the secondary level. In general the science experience at this level should be oriented toward a functional application of the concepts previously learned.

Rather than presenting the science activities as separate lessons at the secondary level, the teacher should endeavor to incorporate the materials in his teaching of practical skills in such areas as occupations, homemaking, home repairs, and safety. With this in mind the suggested experiences at the secondary level will be geared to functional activities. As is characteristic of the previous levels the suggested content and activities are not inclusive, instead they are intended to provide direction to the teacher in the development of his own program.

SENIOR HIGH LEVEL...

ANIMALS

Activities Related to the STUDY OF ANIMALS

Secondary Level

I. Initiatory:

  A. Discuss man's need for and use of animals

  B. Review objectives of previous levels in animal study to reinforce learning and plan for any areas needing further study for establishment of basic, general knowledge

  C. Read about adults whose jobs are related to animal life

    1. Farmers
    2. Veterinarians
    3. Cattlemen
    4. Hunters
    5. Trappers
    6. Exterminators
    7. Butchers

II. Assimilating:

  A. Field trips to a butcher's shop, grocery, veterinarian clinic, farm, ranch, stockyard, pest or insect control center

  B. Speakers such as a kennel owner, butcher, wildlife conservationist, exterminator, veterinarian

  C. Bulletin Boards

    1. Conservation posters
    2. Meat identification charts (naming parts of a beef, etc.)
    3. Illustrations of kinds of insecticides
    4. Illustrations of animals which may be raised for profit
    5. Rules for choosing pets for young children
    6. Hints for freezing meats

7. Rules for protecting animals against disease

D. Related group and individual activities

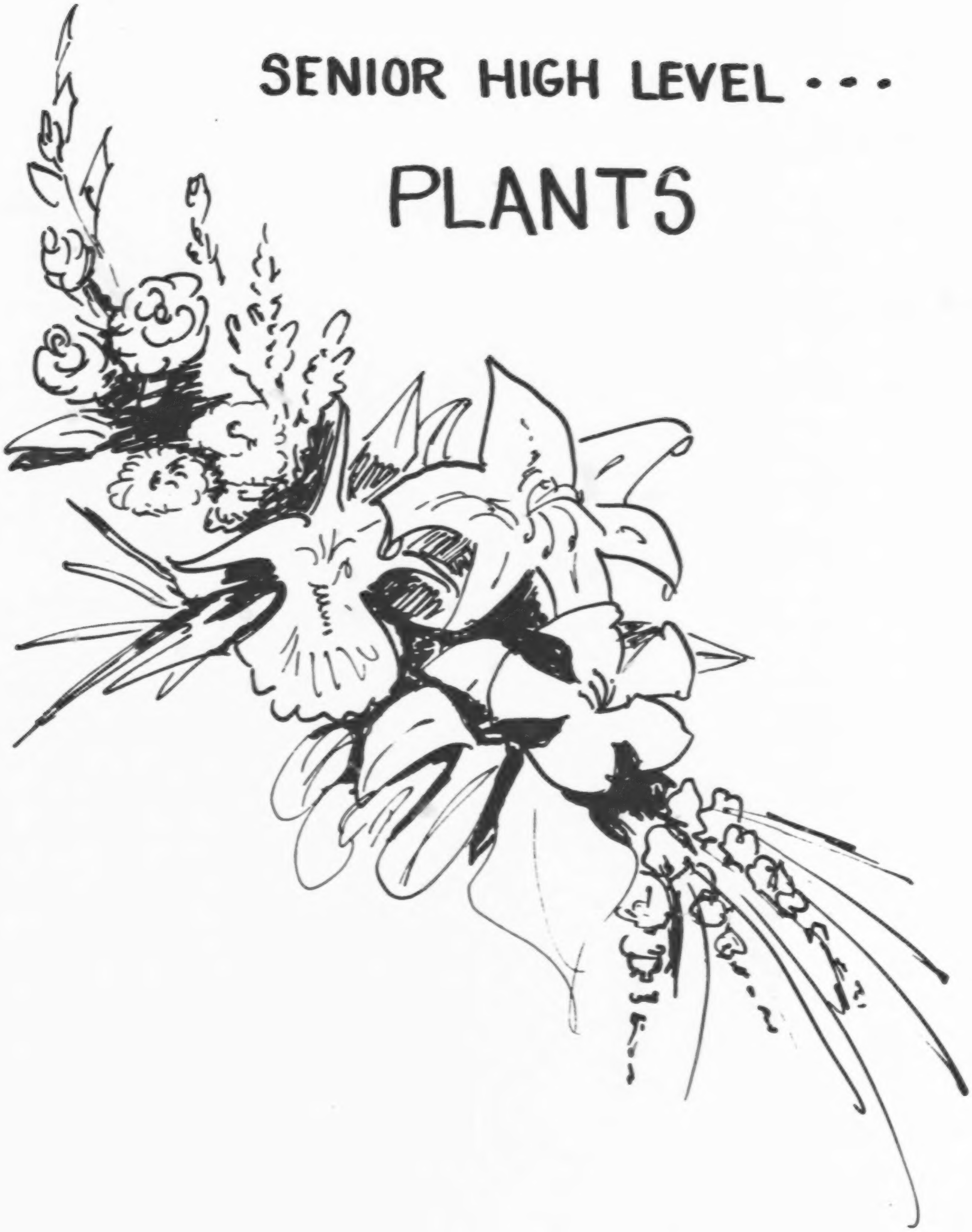
1. Choosing samples of animals which may be bred and raised for profit (i.e., domestic rabbits, chickens, mink, hamsters, gerbils.) Raise these in classroom, with budget accounts of expenditures, records of feeding, growth, loss, etc. Establish method of finding a market for the product and what a fair price would be. Students should compare direct advertising through newspapers to that of selling to pet shops or markets. Relate this to larger scale livestock raising.
2. Learn conservation and safety practices related to animal life. Hunting and fishing may be presented as relatively inexpensive recreational activities. Discuss safety rules, equipment, and varied methods most successful with different types of animals.
3. Practice cleaning (dressing) game and fowl. Compare costs of buying meat which has been completely processed to that which is cleaned and cut up in the home (i.e. fowl, halves of beef, etc.) Consult with butcher on methods of preserving meats, how long meat will remain safe for eating without refrigeration, where meats should be frozen and when re-freezing is possible.
4. Practice pest control through experiments with varied insecticides. Select areas known to have termites, roaches, ants, beetles, flies, mosquitos, or whatever insect pests may be located. Have students "treat" areas to decide whether they may control through commercially purchased methods.
5. Provide a unit study on selection and procedure of selecting

pets for small children. Consider cost involved in purchase and care of pet, pleasure derived from actual experience with pet, amount of care required, and safety of exposure to pet.

6. Visit pet hospital to observe signs of illness and treatment of animals. Discuss diseases which may be transmitted by animal to man. Make class reports on care needed to prevent disease in animals.
7. Discuss possible vocations in which learning related to animal life may be utilized (i.e. poultry farm helper, farm hand, mink ranch helper, kennel man, kitchen worker, meat processing employee, animal hospital clean-up person, turkey farmer, taxidermy, beehives, etc.)

SENIOR HIGH LEVEL . . .

PLANTS



Activities Related to the STUDY OF PLANTS

Secondary Level

I. Initiatory:

- A. Discuss varied uses for plant life
- B. Review objectives of previous levels in Plant study to reinforce learning and plan for any areas needing further study for establishment of basic, general knowledge
- C. Read about vocations in which a knowledge of plant life would be valuable (i.e. landscape gardener, golf course keeper, florists' helper, sod layer, farm hand, vegetable or flower sales)

II. Assimilating:

- A. Field trips to a nursery or greenhouse, florist's shop, vegetable market, farm or vegetable garden
- B. Speakers such as produce manager, home economist or florist (on floral arrangements), farmer, truck farmer
- C. Bulletin Boards
  1. Wide variety of floral and plant arrangements
  2. Food plant classification according to nutritional value
  3. Illustrations of conservation practices related to plant life
  4. Pictures of persons involved in work related to plant life
- D. Related group and individual activities
  1. Study seed packets to learn procedures and times for planting according to instruction
  2. Plant experimental seeds, selecting "good" and "poor" according to size and appearance. Compare resultant plant growth
  3. Have class instruction in floral and plant arrangements.

Use fresh and dried flowers, green (non-flowering) plants for experimentation and class display

4. Study and plant vegetables which may be grown locally. Choose a variety for provision of good nutritional value (for home garden use)
5. Wash and prepare fresh vegetables for cooking. Compare nutritional value of raw and cooked vegetables
6. Acquire area for class care of a lawn. Practice mowing grass, trimming around sidewalks, weeding, trimming hedges, etc. Discuss any erosion problems which may be found and how to overcome such; also cover for shaded, bare spots. Discuss care of mower and other lawn equipment - learn and practice safety habits with this equipment
7. Discuss grains which are grown by farmers which provide food for man and which provide food for animals. Point up that a good grain crop for feeding animals may determine some of the quality of meat going to market
8. Discuss conservation practices which students may practice while camping, visiting parks, or by improving own property

SENIOR HIGH LEVEL-

WEATHER AND SEASONS

240

Activities Related to the STUDY OF WEATHER

Secondary Level

I. Initiatory

  A. Interest and discussion of weather conditions

  B. Review objectives of previous levels in study of Weather and Seasons to reinforce learning and plan for any areas needing further study for establishment of basic, general knowledge

  C. Discuss jobs which are affected by weather, either because they are done outside or are seasonal in nature

II. Assimilating:

  A. Field trip to a weather station

  B. Speaker such as weather analyst

  C. Bulletin Boards

    1. Weather reports from newspaper

    2. Illustrations of weather instruments

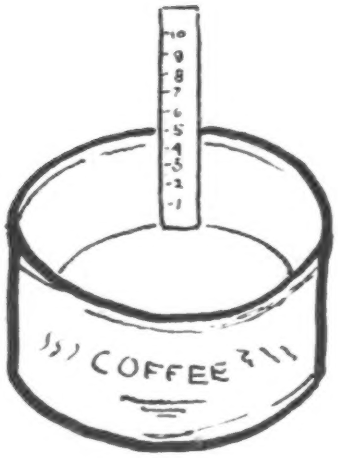
    3. Magazine and newspaper illustrations and accounts of effects of weather

    4. Illustrations of seasonal jobs

  D. Related group and individual activities

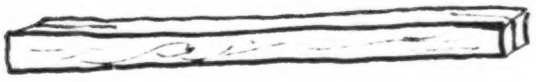
    1. Construct weather instruments according to following instructions. Keep daily weather charts, making predictions, act as a "weather man" providing written daily reports for other Special Education classes

RAIN GAUGE

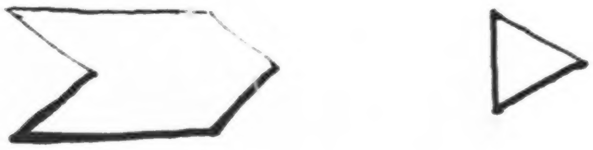

10
9
8
7
6
5
4
3
2
1
COFFEE

Attach plastic ruler to side of can using waterproof glue. End of ruler must rest on bottom of can.

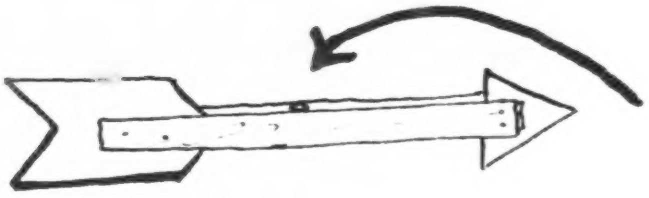
WEATHER VANE



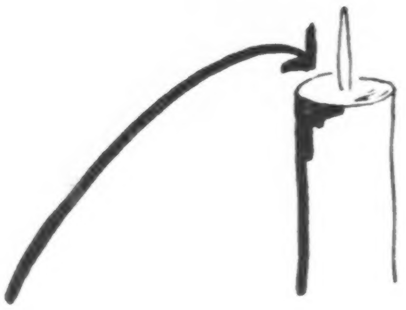
1" x 1" wood piece
12" to 18" long
split at each end



Arrowhead and tail
cut from plastic



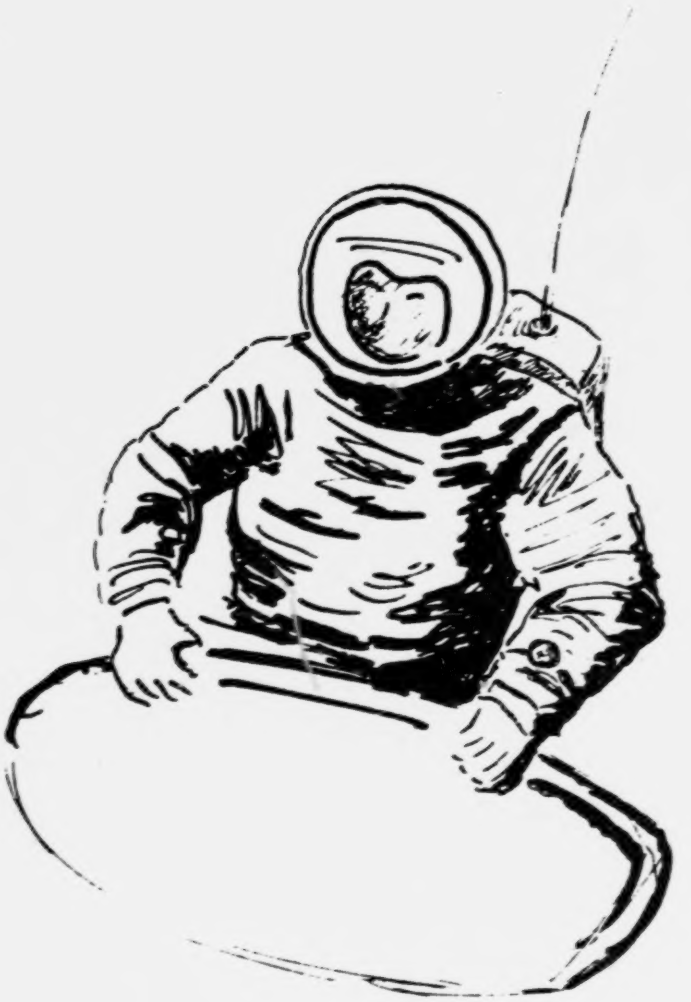
Hole drilled through
arrow at center of
balance



Finishing nail driven
in support

Rub support with candle
to lubricate where arrow
rubs

SENIOR HIGH LEVEL . . .



UNIVERSE

EARTH
AND
EARTH COMPONENTS

Activities Related to the STUDY OF EARTH AND UNIVERSE

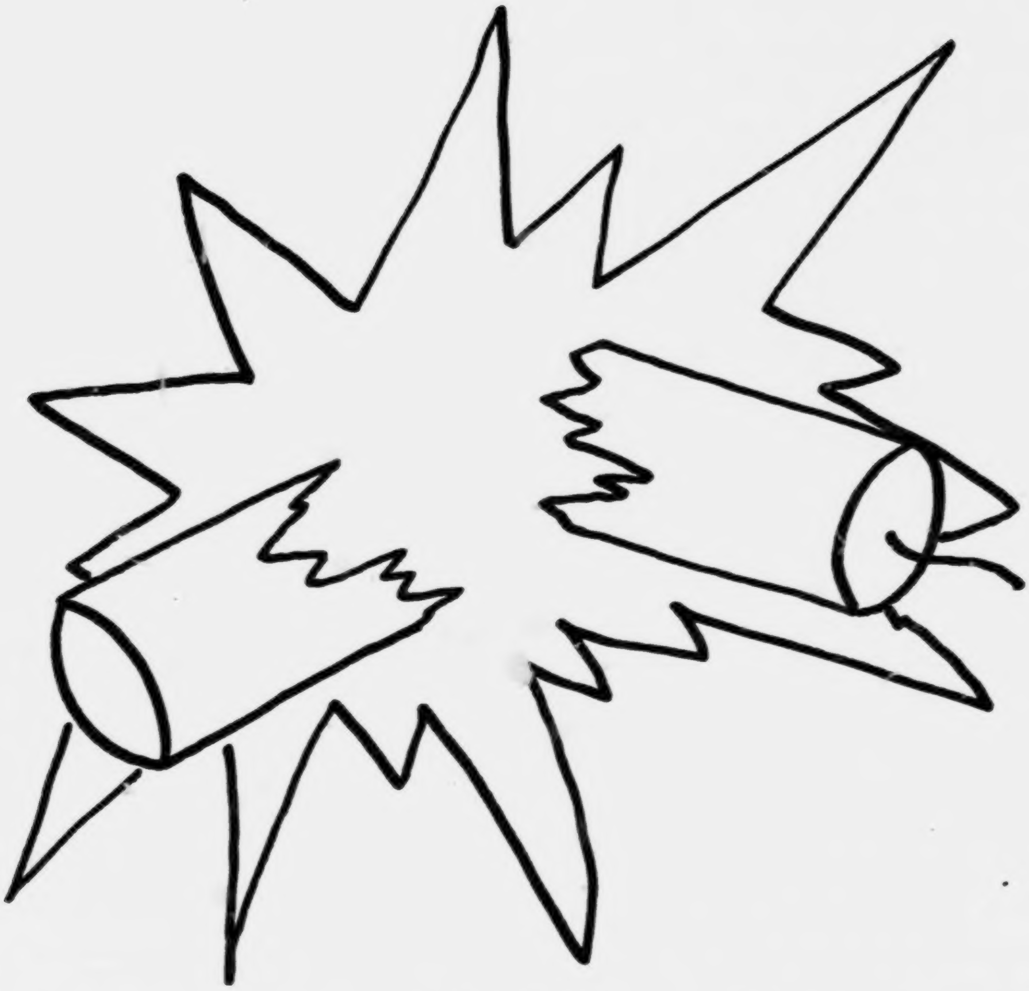
Secondary Level

Ability in these areas of study is more related to the objective which is stated as "to develop the ability to respond in basic social conversation or to identify through sensory experiences....". The emphasis at the senior high level will occur more through deliberate use of incidental teaching than through planned activities. The objectives stated for previous levels will be reinforced and included in various core area activities. The teacher should be aware, at all times, of these previously listed objectives in order to do this effectively.

Use of the news, radio, and television media for correlation of specific objectives with current events is highly recommended. Evidences of earth changes, main effect of changes in earth surfaces, use of natural resources are significant news items which may frequently be available.

Television programs and films presenting specific geographic phenomena and also those stressing practical means of conservation may be used as supplementary material.

Because current space programs are fast becoming an integral part of our society, students should have maximum opportunity for exposure to the accounts of major events within them. Many classes are allowed to view television accounts of rocket launches and satellites. Special Education classes should not be excluded if it is possible to provide such experience.



SENIOR HIGH LEVEL...

FORCES

Activities Related to the STUDY OF FORCES

Secondary Level

I. Initiatory:

- A. Discuss what a force is and how man uses forces
- B. Review objectives of previous levels in the study of forces to reinforce learning and plan for any areas needing further study for establishment of basic, general knowledge
- C. Read stories and view film to illustrate man's use of forces
- D. Emphasis of importance of knowledge and efficiency in uses of forces for vocational competency and skill in position as home/manager

II. Assimilating:

- A. Field trips to electrical repair shop, machine shop, garage
- B. Speakers such as electrical repair man, mechanic, and household appliance salesman
- C. Bulletin Boards
    1. Illustrations of appliances and machines commonly used
    2. Posters on regular efficient care of appliances and machines
    3. Illustrations of indications of repair need on electrical appliances
    4. Posters on safety in use of and around machines
- D. Related group and individual activities
    1. Have fire extinguishers of varied types (both for home and commercial use) available for class experimentation. Teach students (if necessary have member of Fire Department instruct) to use fire extinguishers. Wherever possible, provide actual blaze to be put out. Close supervision and emphasis upon

safety is mandatory. Point up that the extinguisher must be refilled after use. This is done either by a member of the Fire Department or by the dealer from whom the equipment is bought.

Extend this experience to cover Fire Safety as the job of all responsible citizens. Use classroom experiences to show how to put out grease fires, smoke control, and explain the existence of home fire alarm systems. Stress the fact that every family should have a fire escape plan such as schools have. Small children should be prepared as to what they should do in case of fire in the home.

2. Study local ordinances and rules pertaining to the disposition of leaves and trash. Find out if burning is illegal. Discuss why there are rules about burning in residential areas. Where permitted, secure an oil barrel, galvanized garbage can, or trash burner for class practice in safety habits while burning refuse. Stress following instructions regarding not burning aerosol cans.
3. The cooperation of an electrical repair shop may be engaged to provide a classroom display of household electrical appliances with need of repair. Use these to illustrate indication for caution by showing frayed cords, split plugs, worn coils, etc. Guide students to differentiate between minor and major repairs. If possible, acquire appliances requiring minor repair for classroom practice. Students may learn simple repairs which will serve economic purposes as well as possible vocational aid. Replacing cords or plugs on electrical appliances is one

example. Home repair manuals, shop manuals and some science texts are sources of teacher guidance for repair projects.

4. Experiences and learning related to motors, automobile care, machines such as saws, lathes, drills, etc., is appropriate for reinforcement of the objectives previously taught in the study of forces. It is anticipated that such experience may be available through school shop courses and therefore not elaborated here. If such a program is not available, these are possibilities for inclusion in the science program.
5. Further practice in use of knowledge related to electricity will provide more efficient home management and increase safety factors. Students should become familiar with fuse boxes, learn to identify a blown fuse, recognize different sizes of fuses, and know how to replace blown fuses. They show know how to locate and operate a main switch. The different wattage of light bulbs should be known, with stress on which areas within a home need more or less light.

SENIOR HIGH LEVEL···

HUMAN

Activities Related to the STUDY OF HUMAN BEINGS

Secondary Level

I. Initiatory:

- A. Discuss interdependence of all living things
- B. Extensive reinforcement of objectives and activities presented for junior high level

II. Assimilating:

- A. Field trip to local Health Department or Clinic to view facilities and services available
- B. Speakers such as school nurse, social health worker, and athletic coach
- C. Bulletin boards
    - 1. Body systems charts
    - 2. Diagram of local health organizations
    - 3. Illustrations representing varied diseases affecting human beings
    - 4. Posters listing personal and home responsibility for community health
- D. Related group and individual activities
    - 1. Use of activities suggested for junior high level
    - 2. Use classroom experiments to show the effect of cigarette smoke on clothing; relate how stains are caused by nicotine. Study the reports of the effects of smoking upon the human body. List diseases such as lung cancer, cardiovascular disease, chronic bronchitis, emphysema, and peptic ulcer, which may be associated with cigarette smoking.

3. Display and identify isopropyl, methyl and ethyl alcohol. Observe biological specimens preserved in alcohol and point up hardening of tissues. Discuss why alcohol prevents decay. Pour a small amount of a distilled liquor on an egg. Observe coagulation of protein. Relate to action of alcohol on human tissues and digestion. Discuss the immediate and continued use of alcohol and the possible effects upon the human body.
4. Display material related to the current implied increase in use of addicting drugs. Discuss effects of drugs upon the human body and how addiction occurs
5. Discuss organic diseases as those caused by improper functioning of some part(s) of the body. Learn to recognize common symptoms which may indicate an internal disturbance. Recognize heart disease, cancer, diabetes, cirrhosis of the liver, arthritis and muscular dystrophy. Distinguish between diseases which are contagious and those which are inherited.
6. Use microscope, overhead projection of illustrations, and films to show micro-organisms. Explain that infectious diseases may be caused by such germs. Discuss venereal diseases and preventative measures for them.
7. Study the body defenses against disease. Learn ways in which an individual may help the body defenses. Review cleanliness habits which help the skin tissues build barriers against infection. Practice cleansing and using antiseptic on breaks in the skin. Learn measures for preventing illness and the importance of proper medical care.
8. Interview representatives and visit local health organizations

which work for better community health. Make posters for bulletin board which indicate responsibilities involved in accomplishing good community health. Learn how community facilities may be secured if a family needs assistance with health problems.

Suggested Resource Materials

PRIMARY LEVEL

Banks, Marjorie Ann. *How We Celebrate Our Fall Holidays*. Chicago: Benefic Press, 1964.

Banks, Marjorie Ann. *How We Celebrate Our Spring Holidays*. Chicago: Benefic Press, 1961.

Berg, Jean Horton. *Big Bug, Little Bug*. Chicago: Follett Publishing Co., 1964.

Darby, Gene. *What is a Season?* Chicago: Benefic Press, 1959.

King, Patricia. *Mabel the Whale*. Chicago: Follett Publishing Co., 1958.

Parker, Bertha Morris. *Spring is Here*. Evanston, Illinois: Row, Peterson and Company, 1960.

Parker, Bertha Morris. *Summer is Here*. Evanston, Illinois: Row, Peterson and Company, 1960.

Parker, Bertha Morris. *Winter is Here*. Evanston, Illinois: Row, Peterson and Company, 1961.

Podendorf, Illa. *The True Book of Seasons*. Chicago: Childrens Press, 1955.

Provus, Malcolm. *How Weather Affects Us*. Chicago: Benefic Press, 1963.

Udry, Janice May. *A Tree is Nice*. New York: Harper and Brothers, 1956.

INTERMEDIATE LEVEL

Banks, Marjorie Ann. *How We Get Our Dairy Foods*. Chicago: Benefic Press, 1964.

Branley, Franklin M. *A Book of Planets for You*. New York: Thomas Y. Crowell Co., 1961.

Bulla, Clyde R. *A Tree is a Plant*. New York: Thomas Y. Crowell Co., 1960.

Carter, Katharine. *The True Book of Oceans*. Chicago: Childrens Press, 1958.

Darby, Gene. *What is a Butterfly?* Chicago: Benefic Press, 1958.

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Downer, Mary Louise. *The Flower*. New York: William R. Scott, Inc., 1944.

Gibson, Gertrude H. About Our Weather. Chicago: Melmont Publishers, Inc., 1960.

Knight, David C. Let's Find Out About Weather. New York: Franklin Watts, Inc., 1967.

McCabe, Sybil A. How Communication Helps Us. Chicago: Benefic Press, 1964.

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Provus, Malcolm. How We Travel On Land. Chicago: Benefic Press, 1962.

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Schneider, Herman and Nina. How Big is Big? New York: William R. Scott, Inc., 1946.

Selsam, Millicent E. Benny's Animals. New York: Harper and Row, 1966.

Selsam, Millicent E. How To Be A Nature Detective. New York: Harper and Row, 1963.

Selsam, Millicent E. Play With Plants. New York: William Morrow and Co., 1958.

Selsam, Millicent E. You and the World Around You. Garden City, N. Y.: Doubleday and Company, Inc., 1963.

Webber, Irma E. Travellers All. New York: William R. Scott, Inc., 1944.

JUNIOR HIGH LEVEL

Banks, Marjorie Ann. How Foods Are Preserved. Chicago: Benefic Press, 1963.

Barr, Jene. What Will the Weather Be? Toronto: George J. McLeod, Ltd., 1965.

Friskey, Margaret. The True Book of Air Around Us. Chicago: Childrens Press, 1953.

Knight, David C. Let's Find Out About Insects. New York: Franklin Watts, Inc., 1967.

Pine, Lillie S. Friction All Around Us. New York: McGraw-Hill Book Company, Inc., 1960.

Padendorf, Illa. Magnets and Electricity. Chicago: Childrens Press, 1961.

Padendorf, Illa. The True Book of Weather Experiments. Chicago: Childrens Press, 1961.

Uhl, Melvin J. *About Eggs and Creatures That Hatch From Them*. Chicago: Melmont Publishers, Inc., 1966.

Uhl, Melvin. *About Some Animals That Work for Us*. Chicago: Melmont Publishers, 1963.

Webber, Irma E. *Bits That Grow Big*. New York: William R. Scott, Inc., 1959.

Zim, Herbert S. *What's Inside the Earth*? New York: William Morrow and Company, 1953.

SECONDARY LEVEL

Blough, Glenn O. *Useful Plants and Animals*. Evanston, Illinois: Row, Peterson and Company, 1959.

Feravolo, Rocco V. *Weather Experiments*. Champaign, Illinois: Garrard Publishing Company, 1963.

Munch, Theodore W. *What is a Solar System*? Chicago: Benefic Press, 1959.

Smith, F. C. *The First Book of Water*. New York: Franklin Watts, Inc., 1959.

Webber, Irma E. *Thanks to Trees*. New York: William R. Scott, Inc., 1942.

Zim, Herbert S. *Lightening and Thunder*. New York: William Morrow and Company, 1952.

FILMSTRIPS

Order from:

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Cost for complete series : $39.00

PRIMARY LEVEL

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49B The Wheel in Transportation

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49G Transportation by Water

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Series: Fundamentals of Science; Grades 3 and 4

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119B Weather Maps and Weather Forecasting

119C All Kinds of Weather

119F Our Earth is Part of the Solar System

119G Simple Machines

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Series: Science in Everyday Life

43A Water and Its Importance

43C Soil and Its Uses

43D The Sounds We Hear

43F What Makes the Weather

43G Machines for Daily Use

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105D Just Animals

105E Animals Grow and Change

105F Plants Grow and Change

105G Experiences with Water

105H Sounds Around Us

105I Rolling Along (Wheels)

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89B Fluffy, the Chick

89C Frisky, the Colt

89D Billy, the Goat

89E Tiny, the Kitten

89F Fleecy, the Lamb

89G Porky, the Pig

89H Pal, the Puppy

89I Our Poultry Farm (Ducks, Geese, Turkeys)

Series: The American Farmer and Our Food Supply

54D Wheat for Bread
54E Corn for All

INTERMEDIATE LEVEL

Series: The American Farmer and Our Food Supply

54A The American Farmer

54B Animals on the Farm

54C Machines on the Farm

54F Dairy Farming

JUNIOR HIGH LEVEL

Series: *Science in Everyday Life*

43B Air and Life

43C Soil and Its Uses

43D The Sounds We Hear

43E Light in Our Daily Lives

Series: *Fundamentals of Science*
Grades 3 and 4

119B Weather Maps and Weather Forecasting

119D Living Things Need Food

119E The How and Why of Keeping Food

119I Messages Travel and Are Recorded

Series: *The Space Age*

131B Exploration of Space

131E The Conquest of Space

131F Man Travels in Space

SECONDARY LEVEL

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43B Air and Life

Series: *The Space Age*

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131G Hazards in Space Travel

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810-1	The Solar System	$3.95
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810-3	Revolution	$3.95

Teacher Evaluation

Date__________________

Level Taught__________________

Identify lesson and specify activity.

Lesson No.:_______________Lesson Title______________________________

____

Check:

Content: Very appropriate__Somewhat appropriate__Not appropriate__

Suggestions for teacher: Very helpful____Somewhat helpful____Not helpful____

Resources: Very helpful____Somewhat helpful____Not helpful____

Evaluative Statement:

Suggestions for Revision:

Teacher Evaluation

Date__________________

Level Taught__________________

Identify lesson and specify activity.

Lesson No.:______________Lesson Title______________________________

____

Check:

Content: Very appropriate__Somewhat appropriate__Not appropriate__

Suggestions
for teacher: Very helpful____Somewhat helpful____Not helpful____.

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Lesson No.:_______________Lesson Title________________________________

____

Check:

Content: Very appropriate__Somewhat appropriate__Not appropriate__

Suggestions
for teacher: Very helpful____Somewhat helpful____Not helpful____

Resources: Very helpful____Somewhat helpful____Not helpful____

Evaluative Statement:

Suggestions for Revision:

Teacher Evaluation

Date__________________

Level Taught__________________

Identify lesson and specify activity.

Lesson No.:_______________Lesson Title______________________________

____

Check:

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